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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1987

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

NINETY-NINTH CONGRESS

SECOND SESSION

PART 1—BUDGET OVERVIEW

(Pages 1-633)

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DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1987

THURSDAY, FEBRUARY 20, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, Andrews, D'Amato, Rudman, Cochran, Proxmire, Johnston, and Sasser.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE AIR FORCE

STATEMENTS OF:

HON. RUSSELL A. ROURKE, SECRETARY OF THE AIR FORCE
GEN. CHARLES A. GABRIEL, CHIEF OF STAFF, U.S. AIR FORCE

OVERVIEW OF AIR FORCE BUDGET REQUEST

OPENING STATEMENT OF SENATOR STEVENS

Senator STEVENS. Good morning, gentlemen. This hearing begins the subcommittee's examination of the Air Force budget for fiscal year 1987 which totals $101.6 billion for programs covered in the Defense Appropriations bill. This is an increase of $5.9 billion over enacted Defense appropriations for the current fiscal year. Calculated from the post Gramm-Rudman sequestered baseline, the increase is $9.7 billion or 7 percent real growth over fiscal year 1986.

Some areas of the Air Force budget experience real growth in excess of this rate, most notably RDT&E, Missile Procurement and Operations and Maintenance. However, Aircraft Procurement decreases $3 billion largely due to the end of B–1B procurement and the proposed termination of the HH-60 helicopter and T–46 trainer program.

COMPARATIVE STATEMENT

For the record, we would like to have the Air Force submit a comparative statement of budget authority by appropriation account for fiscal year 1985 through 1987. Fiscal year 1986 estimates should reflect the post Gramm-Rudman baseline. This display should include real growth calculations based on the latest economic indicators.

In addition, we ask that the Air Force submit a statement of unobligated balances by account for the latest complete quarter and estimates for the end of fiscal year 1986.

As this is the subcommittee's opening hearing, we will also include in the record at this point the Committee's comparative statement of budget authority for the defense activities included in the Defense Appropriation bill, together with a separate statement prepared by the Department of Defense displaying budget authority and outlays by account for fiscal years 1986 and 1987.

[The information follows:]

COMPARATIVE STATEMENT OF BA AND UNOBLIGATED BALANCES

The following table contains Air Force budget authority and real growth calculations consistent with the FY 1987 President's Budget. The FY 1986 estimates reflect the post Gramm-Rudman-Hollings baseline.

($ in thousands)

Appropriation	FY 1985	FY 1986	Real Growth %	FY 1987	Real Growth %
Mil Personel, AF	17,857,299	17,698,217	- 4.7	19,290,500	+ 4.9
Reserve Personnel	569,607	580,507	- 1.0	546,000	+11.0
National Guard Pers	886,110	922,797	+ 0.1	1,058,900	+10.4
O&M, AF	19,141,165	18,663,234	- 6.0	21,214,500	+ 9.3
O&M, AFR	879,761	858,495	- 4.1	975,600	+12.2
O&M, ANG	1,825,439	1,717,698	- 9.3	1,932,700	+ 8.2
Aircraft Procurement	26,091,424	22,069,908	-18.6	19,127,400	-16.2
Missile Procurement	6,888,245	7,909,732	+10.6	8,982,400	+ 9.7
Other Procurement	8,857,869	8,149,082	-11.0	10,900,300	+28.6
RDT&E	13,484,650	13,115,216	- 6.0	17,275,400	+26.7
Mil Construction, AF	1,572,655	1,581,727	- 3.1	1,773,200	+ 8.3
Mil Construction, ANG	111,200	115,309	- 0.3	140,000	+17.3
Mil Construction, AFR	67,800	59,942	-14.6	58,900	- 5.3
Fam Housing Const	181,123	173,366	- 7.7	109,000	-39.2
Fam Housing, Ops & Debt	703,598	619,262	-15.1	744,500	+15.6
Stock Fund	548,593	395,521	-30.6	239,400	-41.5
Offsetting Receipts	-308,709	-235,000		-247,000	
General Gift Fund	4,060	1,370		80	
Surcharge Collections	58,421	-		39,800	
Air Force Total	99,420,310	94,396,383	- 8.3	104,261,580	+ 6.7

The following table shows unobligated balances by account for the quarter ending 31 December 1985 and estimates for the end of FY 1986. These amounts include all program years available for new obligation during FY 1986. The estimated year end balances reflect the post Gramm-Rudman-Hollings baseline.

($ in Thousands)

Appropriation	31 Dec 85 Unobligated Balance	FY 1986 Estimated Ending Balance
Military Personnel, AF	13,303,869	--
Reserve Personnel	429,489	--
National Guard Personnel	672,718	--
Operation & Maintenance, AF	13,128,835	--
Operation & Maintenance, AFR	604,640	--
Operation & Maintenance, ANG	1,277,102	--
Aircraft Procurement	30,217,117	10,135,195
Missile Procurement	8,358,506	3,382,192
Other Procurement	9,591,851	3,173,314
RDT&E	11,740,630	2,008,008
Military Construction, AF	2,710,293	989,587
Military Construction, ANG	202,323	89,097
Military Construction, AFR	92,452	33,283
Family Housing Construction	375,774	213,031
Family Housing, Ops & Debt	465,155	--
Air Force Total	93,170,754	20,023,707

PREPARED STATEMENTS

Senator STEVENS. Secretary Rourke, we welcome you here for your first appearance as Secretary of the Air Force before the subcommittee, although certainly not your first appearance. We are delighted to see you have become the Secretary of the Air Force.

General Gabriel, we are pleased to see you back again for your overview.

Your prepared statements and biographies will be printed in full for the record. We ask you to highlight your budget initiatives in your opening statements.

[The statements and biographical sketches follow:]

JOINT STATEMENT BY THE SECRETARY OF THE AIR FORCE AND CHIEF OF STAFF

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

The preservation of peace, freedom and independence is America's most fundamental national security objective. In order to ensure this objective is met, and to protect the vital interests of our allies and friends, the Air Force has prudently balanced its forces and capabilities to deter aggression across the spectrum of conflict. Our program to redress serious shortfalls in force structure, weaponry, readiness and sustainability that contribute to deterrence has been successful over the past five years. Our FY 87 budget request will continue to improve these capabilities. Maintaining this momentum is important, since it is the only way to meet effectively the growing threats to our nation's security.

Our progress over the past five years has included significant improvements in a number of vital areas. In terms of strategic modernization, the continued deployment of cruise missiles, improvements in Minuteman III accuracy, and upgraded B-52 avionics have improved greatly our capacity to deal with the threat. Later in 1986, we will achieve initial operational capability of the B-1B and the Peacekeeper missile. We have also seen significant increases in the combat capability of our fighters. In the air-to-air role, pilots flying today's airplanes--with improved missiles, spares and support--would expect to kill half again as many attacking fighters as the 1980 force could have. The air-to-ground picture is even better, with pilots expected to destroy almost two times the number of targets they could have with the 1980 force. Strategic airlift capability has increased through added capacity, modifications, and increased spares. This added capacity is enough to transport an entire airborne division to Europe in the first ten days of a war.

PRIORITIES

By maintaining a sufficient and balanced military capability, we ensure that potential adversaries will face a certainty of loss and an uncertainty of gain that would discourage any decision to take aggressive action. Air Force programs, in conjunction with those of our sister Services, build and maintain the nuclear and conventional capability to respond to any threat to our security. Our FY 87 budget prudently balances expenditures among mission areas so we can operate and sustain today's forces, while investing in future capability needed to meet the changing threat. The effectiveness of our forces depends on getting the most from the resources we have, and our people remain our most critical resource. Support for people and their quality of life is a central concern--they are the very foundation on which our priorities stand. These priorities are to:

- Modernize strategic forces (offensive and defensive)
- Improve readiness and sustainability of general purpose forces
- Increase airlift capability
- Modernize and expand tactical forces

Central to our modernization is the efficient and effective use of space. This nation's heavy civilian and military reliance on space-based systems demands continued improvement in our ability to operate in space and to deter threats to these vital assets.

OUR PEOPLE

Last year we reported the quality of Air Force people was never better. This assessment still rings true. Much of the credit for the dramatic turnaround since the late 1970s belongs to Congress for supporting pay increases and improvements in such benefits as travel allowances, family support centers and other "people programs." We seek continued support for these programs in FY 87 because they permit us to compete with the private sector for scarce manpower and to recruit some of the best people our country has to offer.

Retention is still slightly above historical averages; however, since FY 84 we have seen an increasing number of skilled, experienced people leave the Air Force, particularly pilots and enlisted personnel serving in high-tech and sortie generating specialties. Some of the factors effecting this trend are an improving economy and fundamental changes in the basic fabric of American life; e.g., working spouses. These factors also must be weighed against the realities of military life--frequent relocations, involuntary family separations, difficult living and working conditions, and risk of personal injury or death. Additionally, the increasing perception among our members is that recent pay caps and a mandated change to the retirement system are the "tip of the iceberg." This is why it is so important to continue emphasis on quality of life issues, such as easing the burden of PCS moves and providing dependent dental care.

MANAGING RESOURCES

Public attention continues to focus on the defense acquisition process and the price and dependability of the goods procured. The Air Force places great emphasis on being a good steward of the American tax dollar. Our record is not perfect, but instances of abuse, overpricing, and poor product reliability are relatively few in comparison with the magnitude of Air Force procurement tasks. In fact, when the size of our procurement program is considered--we have more than 890,000 kinds of items in our supply system alone--our record is remarkably good.

One of the most powerful tools we use in attacking procurement inefficiencies is the natural force of the competitive market. The competitive atmosphere has produced positive results, such as the $2.5 billion we expect to save in our Alternate Fighter Engine Program. We've added over 1,560 people to Competition Advocate offices and contracting agencies devoted entirely to our goal of reducing costs through increased competition. At the end of FY 85, over 87 percent of our procurement dollars were either competitively priced or follow-on to production programs originally competed. The Air Force has used the concept of multi-year contracts for weapon systems like the F-16, B-1B and KC-10. To date, this has saved the American taxpayer more than $3 billion. A side benefit of this approach is that it helps bring down the price of spare parts. On the B-1B multi-year contract alone, we expect to save $160 million in spares costs.

The key to reducing the cost of maintaining and supporting our forces in the future lies not only in vigilance but also in planning and design. We are committed to placing reliability and maintainability (R&M) on an equal footing with performance, cost, and schedule when we buy new weapon systems. The Air Force will demand improved R&M from defense contractors and reward them for following through. Better R&M pays off in the long run and offers great potential for future efficiencies. A vivid example of this is the Advanced Tactical Fighter (ATF) program, where R&M goals have been made as important as performance goals. As a result, we anticipate the sustained sortie generation rate of the ATF will be about twice that of the F-15. Mobility requirements should be cut in half, and fewer maintenance personnel and less support equipment will be required.

STRATEGIC MODERNIZATION

Of all the threats to our national security, none is so clear or so potentially devastating as the threat of nuclear war. The strategy and forces necessary to deter such a conflict have been, and will remain, preeminent in our military structure. Because of congressional support and the commitment of the American people, strategic modernization of our two legs of the Triad, land-based ICBMs and manned bombers, has produced significant results.

The 1986 Defense Authorization Bill approved deployment of 50 Peacekeeper missiles in existing Minuteman silos, and we are investigating deployment options for the second 50 missiles. The small ICBM (SICBM), with its single warhead design, supports stability objectives by decreasing individual target value and by increasing the survivability of our land-based missile leg of the Triad. The SICBM's light weight makes it compatible with a broad range of more survivable basing modes, particularly mobile options.

Modernization of the most flexible element of our strategic forces, the manned bomber, is also proceeding well. With increased Soviet emphasis on mobile ICBM delivery systems and command centers, the manned bomber's potential for real-time location and destruction of such systems is vital to deterrence. The 100 funded B-1Bs start to assume the penetrator role from the older B-52s later this year. Research and development continues on the new, long-range, advanced technology bomber (ATB) that will incorporate low observable technology and take over as our primary penetrator in the mid-1990s.

Strategic defense is being improved by modernizing our continental air defense forces and upgrading both our ballistic missile and atmospheric warning systems, providing the National Command Authorities (NCA) with better attack warning and attack assessment information. We are also pursuing, in consonance with the President's Strategic Defense Initiative, research efforts that could provide a comprehensive strategic defense if a decision is made to develop a capability in the future. Continued emphasis on the President's Strategic Modernization Program and on the development of defense technologies is key to equitable and verifiable arms control initiatives that seek to reduce nuclear arms, provide a credible deterrent, and promote a stable and peaceful world. Successful arms reduction depends on our ability to negotiate from a position of strength, a position we can maintain only by modernizing the Triad and by vigorously developing defense technologies.

READINESS AND SUSTAINABILITY

Our force today is more modern, more capable and maintained at a higher level of readiness and sustainability than in 1980. The flying time for the tactical air forces has increased by 36 percent. We have realized an 83 percent increase in our ability to support fighter wartime sortie generation, due primarily to an increased number of spare parts. Our peacetime spares funding has increased by over 200 percent, and the mission capable rate of our aircraft is up 12 percent. In our newest fighters, the F-15 and F-16, we have reached 80 percent mission capable rates. We increased fighter exercise participation by 93 percent and C-130 intratheater airlift exercise participation by 51 percent. The dividend paid on these investments can be seen in the results of our combat crew competitions and by a steadily declining accident rate. The 1985 rate of 1.49 mishaps per 100,000 flying hours is a new record.

FORCE PROJECTION

Thanks primarily to aircraft modifications and increased stocks of spares, our airlift force can now deploy about 25 percent more combat power than in 1980. Our FY 87 funding request will complete the buy of 50 C-5Bs, 60 KC-10s and the cargo-convertible features of the Civil Reserve Air Fleet. By 1990 we will have almost twice the intertheater airlift capability we had in 1980, but still less than needed.

The C-17 is the heart of our future force projection capability. This crucial mobility asset will increase our strategic lift capacity and reduce intratheater movement demands, while saving more than $16 billion and 15,000 people over other airlift alternatives. We will be able to combine the long range intertheater aircraft with the ability to routinely deliver the full range of Army equipment directly where needed. In addition the C-17 will require about one-third of the maintenance manhours per flying hour as the C-5A.

Air refueling capability must be increased to meet growing requirements for all our strategic and conventional forces. New CFM56 engines and additional improvements on the KC-135s provide a 50 percent increase in capability at a fraction of the cost of new aircraft.

One of our nation's most difficult challenges is how to deal with conflicts occurring below the threshold of theater warfare such as regional conflict, insurgency, and terrorism. Low Intensity Conflict (LIC) is a broad term used to characterize such conflict, and the center we've just established with the Army at Langley Air Force Base is a big step in meeting this challenge. The Center will examine Low Intensity Conflict in an integrated way, focus on what has to be done and look into how we can make the best use of the resources we have, including those capabilities designed specifically for special operations. The Center is also the focal point to plan and program for the integration of future forces.

THEATER FORCES

Three programs are essential to ensuring our forces are capable of meeting the threat of the 1990s: the Advanced Medium Range Air-to-Air Missile (AMRAAM), the Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN), and the Advanced Tactical Fighter (ATF). The intense interest in the AMRAAM program is matched only by its importance to the air battles of the future. It will give our fighters the combat employment range, power, and improved survivability needed to win air battles against a numerically superior foe. AMRAAM is a technological success, and we are confident the program will be certified within congressional guidelines. LANTIRN will provide badly needed improvements in the air-to-surface role. Our ability to attack effectively targets at night and in poor weather is the key to denying the enemy his objectives. LANTIRN provides this capability across the spectrum of theater conflict. The restructured program is on track and meeting or exceeding our expectations. In the longer term, the Advanced Tactical Fighter (ATF) will be the key to gaining air superiority against a rapidly modernizing and numerically superior Soviet air threat. Soviet advances will have equaled our present capability by the mid-1990s. The ATF is the next step in the evolution of our air superiority capability, and only an aggressive and timely development program will allow us to keep our advantage.

SPACE

US national security interests are heavily dependent on space-based systems, and this dependence is growing. Space systems support the strategic and conventional forces of all US Services world-wide by providing vital communications links, weather information, surveillance and warning, and navigational support. Air Force objectives in space include pursuing a vigorous research and development program to give the US future options in space, moving to space those functions best accomplished there, and developing an effective antisatellite system to deter Soviet attacks against our satellites in orbit. We're also emphasizing programs to make US space systems--the satellites, the ground stations and the communications links between them--more capable and survivable in hostile environments.

We recently opened the Shuttle launch facility at Vandenberg AFB, California. The first military Shuttle mission from this facility had been planned for later this year, but may be delayed in light of the Challenger's accident. At the same time, we're developing a complementary expendable launch vehicle (CELV). The Shuttle will remain DoD's primary launch vehicle, but CELVs will provide a prudent safeguard against unforeseen technical or operational problems with the Shuttle, give additional launch flexibility in crisis situations, and allow us to maintain a space launch industrial base.

INSTALLATIONS

Even with the most up-to-date weapon systems, our combat capability suffers if our base facilities are outdated and need repair. The need for renovation, repairs and replacement is continual and cannot be deferred. A high priority is construction of support facilities and housing at our Ground-Launched Cruise Missile (GLCM) main operating bases in Europe. Without facilities poor retention and low experience levels will become chronic problems, resulting in higher costs for training, temporary duty and permanent change of station.

We are also dedicating considerable effort to improving the environment at our installations. The Air Force Installation Restoration program (IRP) is a four-phase effort to identify the locations and contents of past toxic or hazardous waste sites on currently or formerly owned/used property and to eliminate the hazards in an environmentally responsible manner.

SUMMARY

Without doubt, 1987 will be the most challenging year of our force modernization program. We believe the balanced approach we have selected will provide the essential combat capability to counter the threat. We face critical milestones in all force elements: strategic, mobility, tactical and space. Perhaps most importantly, we must not renege on our promises to the people who make it all work and who are our most valuable resource. With congressional support we will continue to increase the security of the American people and ensure a favorable global balance within the bounds of fiscal responsibility.

Honorable Russell A. Rourke

The New Secretary of the Air Force

Mr Russell A. Rourke became the Secretary of the Air Force in December 1985. Prior to his appointment, Mr Rourke served as Assistant Secretary of Defense for Legislative Affairs from 7 May 1981 until he was sworn into office as the Secretary of the Air Force.

As Assistant Secretary, Mr Rourke was the principal advisor to Secretary of Defense Caspar W. Weinberger on congressional consideration of the department's legislative program, maintained direct liaison with the Congress, the Executive Office of the President and other government agencies on defense legislative matters, and kept watch over the military departments congressional activities on defense matters.

Prior to May 1981, Mr Rourke served 19 years as Administrative Assistant to several Republican members of Congress, including Representative Harold S. Sawyer (R-Michigan), 1977-1981; Representative Henry P. Smith III (R-New York), 1965-1974; and Representative John R. Pillion (R-New York), 1960-1964.

In between his service on Capitol Hill, Mr Rourke served on the White House staff from 1974-1977. From 1976-1977 Mr Rourke was Special Assistant to President Gerald R. Ford. In this capacity he was responsible for legislative liaison between the White House and the Congress and participated regularly in policy and program meetings with the President, members of the Cabinet and White House senior staff. From 1974-1976 he was Deputy to Presidential Counsellor John O. Marsh Jr.

Prior to entering government service, Mr Rourke was associated with the law firm of Keough, Carey and Costello, Washington DC from 1959-1960. Also, in 1974 he was the Republican-Conservative nominee for Congress in the 36th District of New York.

Mr Rourke has a distinguished military service record. He enlisted in the United States Marine Corps in 1953 and was released as a 1st Lieutenant in 1956 following service in Korea. Mr Rourke subsequently entered the U.S. Marine Corps Reserve and retired with the rank of Colonel in July 1985 following 32 years of service. His personal decorations include the Legion of Merit.

He was born December 30, 1931, in New York City, New York. He graduated from the University of Maryland in 1953 where he received his bachelor's degree with honors. In 1959 he received his LLB from the Georgetown University Law Center.

Mr Rourke was married in 1961 to the former Judith Anne Muller. They have three daughters: Patricia, Elizabeth and Mary Frances.

GENERAL CHARLES A. GABRIEL
CHIEF OF STAFF OF THE AIR FORCE

General Charles A. Gabriel is Chief of Staff of the United States Air Force and a member of the Joint Chiefs of Staff. He was born January 21, 1928, in Lincolnton, North Carolina. Following graduation from high school, he attended Catawba College, Salisbury, North Carolina, for two years before entering the US Military Academy, West Point, New York. He graduated from the academy in 1950 with a bachelor of science degree and a commission in the US Air Force. General Gabriel earned a master of science degree in engineering management from The George Washington University, Washington, D.C., in 1963. He graduated from the Command and Staff Course at the Naval War College, Newport, Rhode Island, in 1962 and the Industrial College of the Armed Forces, Fort Lesley J. McNair, Washington, D.C., in 1967.

After graduation from West Point, General Gabriel entered pilot training at Goodfellow Air Force Base, Texas, and completed advanced training at Craig Air Force Base, Alabama, in December 1951. His first assignment was to South Korea, where he flew 100 combat missions in F-51s and F-86s and was credited with shooting down two MiG-15s. From December 1952 to November 1955, General Gabriel was assigned to the 86th Fighter-Interceptor Wing, Landstuhl Air Base, Germany, as a pilot and later a squadron air operations officer. He then spent three years as an air officer commanding at the US Air Force Academy, Colorado.

In July 1959 General Gabriel transferred to Moody Air Force Base, Georgia, where he served as adjutant for the 3550th Pilot Training Group and commander of the Headquarters Squadron Section. Following graduation from the Naval War College in August 1962 and completion of his master's degree at The George Washington University in August 1963, he was assigned as a staff officer in the Directorate of Plans, Headquarters US Air Force, Washington, D.C., until August 1966 when he entered the Industrial College of the Armed Forces.

Returning to Europe in August 1967, General Gabriel served as executive officer to the Chief of Staff, Supreme Headquarters Allied Powers Europe, Mons, Belgium. He returned to the United States for combat crew training in July 1970 and was subsequently assigned as Commander of the 432nd Tactical Reconnaissance Wing at Udorn Royal Thai Air Force Base, Thailand, flying 152 combat missions in F-4s. He returned to the Air Staff in July 1972, as Deputy for Operational Forces and Deputy Director of Operations.

General Gabriel served as Deputy Chief of Staff for Operations at Headquarters Tactical Air Command, Langley Air Force Base, Virginia, from February 1975 to August 1977. He then became Deputy Commander in Chief, US Forces Korea and Deputy Commander in Chief, United Nations Command, Seoul, South Korea.

In April 1979 he returned to Air Force headquarters as Deputy Chief of Staff for Operations, Plans and Readiness. He was promoted to general on August 1, 1980, and was appointed Commander in Chief, United States Air Forces in Europe and Commander, Allied Air Forces Central Europe at Ramstein Air Base, Germany. He served in this capacity until June 1982 and assumed his present duties in July 1982.

General Gabriel is a command pilot with more the 4,200 flying hours. His military decorations and awards include the Defense Distinguished Service Medal, Air Force Distinguished Service Medal, Legion of Merit with one oak leaf cluster, Distinguished Flying Cross with four oak leaf clusters, Air Medal with 14 oak leaf clusters, Air Force Commendation Medal with one oak leaf cluster, Presidential Unit Citation emblem, Air Force Outstanding Unit Award ribbon, Republic of Korea Order of National Security Merit (Gugseon Medal) and Republic of Korea Presidential Unit Citation.

General Gabriel is married to the former Dorothy Cutts of Oxford, North Carolina. They have two children: Jane and Charles.

AIR FORCE PROGRAMS

Senator STEVENS. First, let me call on Senator Proxmire.

Senator PROXMIRE. I have no opening statement.

Senator STEVENS. Mr. Secretary, please proceed.

Secretary ROURKE. Thank you, Mr. Chairman.

I will submit the major portion of my statement for the record. I appreciate your including it therein. I will be brief in the interest of the questions which are the most important part of every hearing.

Senator STEVENS. Let me interrupt you, Mr. Secretary.

We have a policy in this committee to include your background statement. The first time a Secretary or officer appears, we like to put it in the record. It will be appended to your joint prepared statement.

THE THREAT AND THE DEFICIT

Secretary ROURKE. I am pleased to discuss Air Force programs. Getting past the courtesies which I would also extend to three such outstanding members of the Senate, I must lead as my mentor has done, at the risk of a counterthreat, right into the threat which I know you have all heard ad nauseam and infinitum.

Since I share an equal degree of enthusiasm with Secretary Weinberger, I must not pass up any opportunity to touch briefly on the threat. I am somewhat shy to make that statement in front of three gentlemen who have spent more than half their adult lives both on the threat, and indeed of late, on the deficit problems we have.

It is superfluous to say that as the size of the deficit increases, so does the size of the threat. Further, that threat is not a self-destructing one, but has increased proportionately.

Getting on the positive side, we have made progress. I say "we" having served as Air Force Secretary for 2 months, but also based on a 5-year prior tour as Assistant Secretary, as you know, at the Pentagon along with 20-odd years on the Hill and in the White House; I think I have some measure of experience to draw upon.

AIR FORCE PERSONNEL

I am enormously impressed with the Air Force from my day-to-day experience, not simply from reading reports and observing people in Air Force policy councils, but from day-to-day involvement with Air Force personnel. I have taken the opportunity to travel now to almost all the major commands.

Despite all of the agony, I must say, over Gramm-Rudman, and the confusion it has created in the field, it is our job to unravel that confusion for the officers, men, and women of the Air Force.

We are attempting mightily to perform that chore. Having said that, one would think after certain discussions that the Air Force, or indeed any of the Services, would be coming apart at the seams because of the threat of Gramm-Rudman. I do not find this to be the case.

AIR FORCE READINESS

I find a sense of concern. I find a keen sense of awareness about budget priorities. I find Air Force readiness at the highest state it has ever been in our history. I find that Admiral Crowe possesses no less enthusiasm in his observations of the state of readiness of our armed services than did General Vessey as he departed active duty.

In one of his last statements, General Vessey, whom I respect as much as any military leader that I have known in my brief 54 years, said if you had told him in 1981 that the state of our armed forces would reach the readiness and the capability that they have today, he would have said you are crazy. Those were his exact words. He has had many good things to say from the military side. It is amazing sometimes, the different comments elicited not only from men in military uniform, but also from a vested pinstriper in the bureaucracy. The kind of forthrightness that is displayed after they end Government service. Anyway, General Vessey's comments were right on target. I subscribe to them completely.

DEDICATION OF AIR FORCE PEOPLE

Another item I would like to touch on briefly is the high quality and dedication of our Air Force people. Having visited bases and having spoken with so many of our people in not only formal speeches, but also private conversations, I am impressed. Having had somewhat different experiences with other services over the last 21 years as a member of an active duty force and 29 years as a Reservist, I cannot tell you how enormously proud I have been of the people in the Air Force.

EDUCATION LEVEL OF AIR FORCE PERSONNEL

You have met them. I know you have breakfasted with them. You have met them in Europe, Mr. Chairman, on any number of occasions. You have seen the troops: 98½ percent of our enlisted people are high school graduates from good, accredited high schools. Almost half of these people have 15 or more hours of college work behind them. They are absolutely the kind of people we not only want, but we absolutely require for the sophisticated systems we have today.

We do not have a "Jobs" program in the Air Force. Our progress is one we are proud to say, where we are able to pick from the very best. We have gotten the very best. Thus far, we are able to keep them. The officer corps is equally impressive. Almost half of our officers, from Second Lieutenant to four star Generals, have graduate degrees.

It is a different world than when you and I were boys in the service. These graduate degrees have been earned in their own time. For general officers the figure is even higher, almost 85 percent have graduate degrees, enormously impressive. The point is this: We simply cannot afford to lose in large numbers this kind of highly skilled, highly motivated force of dedicated people.

ACQUISITION PROCESS

The last item, Mr. Chairman, if I may, is a discussion of the critically important acquisition process. If we have so much brains in the Air Force, as I indicate, and we have the kind of dedication of which I spoke, why can't we do a better job in the acquisition process?

Senator Proxmire has addressed himself to this; we all have addressed ourselves to this critical area. I can tell you it is an understatement that our system, as it presently operates, is not perfect. It is an imperfect system. It always will be an imperfect system. Our job is to make it as near perfect as we can.

I know, as you are aware from the statistics, that we have 870,000 different kinds of parts in our supply system. It takes an enormous amount of attention to detail. This is the kind of attention we intend to give to that subject area during the brief tenure I have as Secretary of the Air Force. We intend to ratchet the horror stories down, to eliminate the cost overruns that have plagued us and have virtually, at one stage or another, undercut this administration's tenure in office. This in spite of the fact that the wildly enthusiastic support of the American public and the Congress for the rebuilding of our defenses and our whole strategic modernization program has waned.

I do not have to tell you because you have given those speeches. The diminution in credibility that we have suffered has been extremely harmful. It is our job, and it is an area that will occupy a vast amount of our time, to dig into and reverse that trend and to restore that credibility.

SPARE PARTS AND EQUIPMENT PRICING

Mr. Chairman, the Air Force was the first, I might say and we could argue that fact for about 3 hours, to recognize that we had a spare parts and equipment pricing problem. We think we have been among the first, in any event, to develop an extremely aggressive program to fix it. We have worked hard to identify the root causes of the problems and have 300 actions in progress to eliminate them.

I will not bore you with the details, but we will submit for the record the specific programs we have underway and indicate the dedication we intend to apply to those corrections.

[The information follows:]

SPARES/SUPPORT EQUIPMENT ACQUISITION REFORM

The Air Force conducted an Air Force Management Analysis Group (AFMAG) study of the spares acquisition process in 1983 (final report issued October 1983). The study found deficiencies in four major areas: competition/breakout, pricing techniques, economical quantity buys, and employee awareness. The report contained 178 specific initiatives aimed at improving spares acquisition. The implementation of the AFMAG recommendations is managed by a General Officer Steering Committee (GOSC) comprised of General Officers and equivalent civilians from the Air Staff and throughout the acquisition community. This committee meets on a monthly basis to review progress on each of the initiatives and to ensure that the corrective actions will result in a "long-term fix." As of 20 February 1986, 168 of 178 recommendations have been closed. The remaining 10 initiatives are expected to be closed by December 1986. A study similar to the AFMAG effort dealing with the acquisition of support equipment was accomplished in 1984 (final report issued in July 1984). This report contained 107 initiatives (128 specific recommendations) dealing with improving the way the Air Force acquires its support equipment. The most significant actions involved the development of a Support Equipment Master Plan (SEMP), creation of a Support Equipment Center of Expertise, and a change in philosophy in how we treat support equipment. As of 20 February 1986, 122 of the 128 recommendations have been closed.

RELIABILITY AND MAINTAINABILITY PROGRAM

The key to reducing the cost of maintaining and supporting our forces in the future lies not only in the increased vigilance of which I spoke, but also our planning and design.

The general officer on my right, coordinated with my predecessor on February 1 last year, in what they called the R&M 2000 program, the reliability and maintainability program. It is something we take very, very seriously.

I know the contractors themselves now take it seriously. We want to see our systems malfunction less often. When they do, we want to make certain they can be fixed easier and faster.

General Gabriel has done—we can go through the morning complimenting each other—but I must observe independently the outstanding job he has done in that area.

CONCLUSION OF MR. ROURKE'S OPENING REMARKS

Mr. Chairman, in looking at the balance of my statement, I have heard each of the members on the dais say some of the remaining things that appear in my statement. I will not trouble you further, but will reserve the balance of my time for questions.

Let me say, having worked with all of you for the last 27 years now, and with Sean O'Keefe and Dwight Dwyer, two extraordinarily talented individuals; I have enjoyed it. Senator D'Amato, who is just now coming in, has raised the devil with me on any number of occasions in the last 5 years and probably will this morning, I have enjoyed working with you enormously. I am not a masochist, but I am one who thinks that the process works best when people give it everything they have and do not pull any punches. I have not seen any of you indicate any enthusiasm for pulling punches.

I stand ready not to participate in a bout, but working with you to make America's defense system work better and work for less dollars to achieve what we all want to achieve—an intelligent, fiscally responsible, situation that Americans can live with.

Thank you, Mr. Chairman.

Senator STEVENS. Thank you, Mr. Secretary.

You strain credibility when you talk about our mutual background, having been boys together.

General, your biography will appear with that of Secretary Rourke following the joint prepared statement. Please proceed.

CHIEF OF STAFF, U.S. AIR FORCE

CAPABILITY IMPROVEMENTS

General GABRIEL. It is a pleasure to represent the men and women of the Air Force. These men and women are proud to be in the Air Force. They are proud of their country and they are really proud to serve in the greatest Air Force in the world.

I want to thank Congress, you who have made this possible, you and the American people. Let me say this is the Secretary's first appearance before you. This will be my last.

Again, I appreciate everything you have done to help us build a better defense. I will cut this short so that we can get to questions. I will expand a little on what the Secretary has said, especially about the capability improvements we have made. I will highlight a few of those.

I can subscribe to General Vessey's comments completely. I came in at the same time he did. It is amazing. I have never seen in my 36 years of service the buildup that we have had. I would like to brag a little about some of those things that we have done that are most important.

PRESIDENT'S STRATEGIC MODERNIZATION PROGRAM

The first is the President's strategic modernization program and the two legs that we have in the Triad, the bombers and ICBM's. We have taken those old B–52's and made offensive avionics mods on them that have given much better reliability and maintainability and better accuracies. We have added ALCM to them also and now have five squadrons of B–52's with ALCM missiles; there will be eight by this summer. With the bomber improvements I mentioned, we have seen a 90 percent increase in target kill capability against the Soviet's command and control bunkers. Further, because of accuracy improvements, the Minuteman III now gives us 80 percent better target kill against the SS–18. We are making good progress with the systems we have.

Later this year, of course, we will see the IOC of the B–1B and the Peacekeeper. That will make one heck of a difference in my mind in deterrence, a much stronger position on our side.

We have the small ICBM ahead of us. It is a single warhead missile. It has reduced target value. We are looking at basing modes to move them around. That will give us more survivability and give the Soviets more uncertainty in terms of their potential gain.

For the mid-1990's we have the Advanced Technology Bomber and the improved cruise missile. That will give us more capabilty and flexibility.

In tactical fighters, we have had significant increases also. In the air-to-air mission we can now kill half again as many targets as we could 5 years ago. In air-to-ground we are almost double what we could do in those days.

IMPROVEMENTS IN ACCURACY

Let me give a couple of examples of the accuracy improvements we have seen.

ACCURACY IMPROVEMENTS

Gunsmoke is a fighter meet we have at Nellis every other year. This year if the 1981 winning team had been competing, it would have come in a poor tenth because of the scores. Most of the changes have resulted from the F–16's, but we have made improvements on the other systems.

It was tough competition. The No. 1 outfit won by 2 points out of a possible 10,000. That is one bullet. The winner was a F–16 Reserve outfit from Hill Air Force Base in Utah. The second was an active F–16 outfit from Germany.

In the 200-foot level bombing event the winner, out of six bombs, hit the turret of the tank with five. The top five teams on the navigation run came within three-fourths of a second of their required time on target. We gave them all Mickey Mouse watches. We showed we could get the aircraft in on time and with pinpoint accuracies.

STRATEGIC MODERNIZATION PRIORITY PROGRAMS

On modernization to meet the threat, we have three priority programs. I will not go into detail. The AMRAAM is a new one, it is a technological success and is working well. We need this system. An F–15 equipped with AMRAAM will be twice as capable as one with AIM–7's. The F–16's currently equipped with the AIM–9, will be six times better with AMRAAM.

LANTIRN is designed for night and poor weather. I did not think we could do what we can now do with this system.

The ATF for the longer term is the next generation air superiority fighter in the mid-1990's. It will be 20 years by then, since we produced an air superiority fighter. So, we need the ATF to go against the Fulcrum and Foxhound that the Soviets are building now.

ATF RELIABILITY AND MAINTAINABILITY

On the R&M 2000 that the Secretary mentioned: we have traditionally used cost, schedule, and performance measures in contracting; we have now added reliability and maintainability.

For the ATF, we are putting reliability and maintainability up front. You can make tradeoffs on performance very easily early in a program. Taking off a small margin of performance could give you quantum jumps in reliability and maintainability.

STRATEGIC AIRLIFT

We have increased strategic airlift 25 percent over the last 5 years with modifications; increased spares; and added capacity. Our 1987 request will complete the buy of 50 C–5B's and 60 KC–10's. This year we will complete the cargo convertible features of the Civil Reserve Air Fleet.

By the end of the decade we will have twice as much lift capability as we had in 1980.

The C–17 is the airplane of the future. It is the most cost effective way to get us to the 66 million ton-miles a day that we need. In inter- and intra-theater it has great advantages.

INTERSERVICE COOPERATION

In addition to these programs, we continue to pursue interservice cooperation that General Wickham and I started, and now the other Services are all involved. We had 31 initiatives; to date we have completed 20. We have added four. That is going very well. It is exactly what you want us to do, sort out the duplication and the voids and do it the smartest way to get the best combined combat capability.

SPECIAL OPERATIONS FORCES

In terms of special operations forces, we are giving our highest priorities to PAVELOW HH–53's, MC–130's, and gun ships. We are building a good force structure in all three.

TACTICAL FORCES DECLINING ACCIDENT RATE

Readiness and sustainability improvements have given our tactical forces 36 percent more flying time. We can generate and support 83 percent more combat sorties today in the tactical business than we could 5 years ago. We are training more realistically. We have more proficient crews.

The big payoff has been our declining accident rate. Last year we had an all time low, 1.49 accidents per 100,000 flying hours. I never thought we would see much less than 3.00 per 100,000 hours. If we had kept the same accident rate that we had in 1980, we would have lost 110 more aircraft. That is about a wing and a half of fighters and it would have cost about $1.6 billion in replacement costs not to mention all the precious lives of the crews that might have been lost as well.

BALANCE READINESS AND SUSTAINABILITY

So, on readiness and sustainability, I cannot say enough about why we should continue to support the force that we have.

The key to everything is to balance readiness and sustainability today with tomorrow's force structure; balance strategic versus conventional forces; and balance the mix of Active and Air Reserve Forces.

ACTIVE AND RESERVE FORCES

We are very proud of what we have accomplished in the active and reserve forces. The Air Reserve Forces are flying all our first-line aircraft except medium and heavy bombers because of the bombers' mission. They are growing many times faster than the active force. In fact, the active force is down to practically no increase while the Reserve is still growing. The Guard and Reserve commanders tell me they are absorbing as much as they can as fast as they can.

In addition to the Reserve F–16 Gunsmoke winner I told you about, an A–7 Guard pilot was a strafe winner in the shootout. A C–130 Reserve unit from Georgia won the Volant Rodeo airlift competition and an F-4C Guard unit from Idaho won the tactical reconnaissance competition.

The Air Reserve Forces that we have are good and we love them. It is a solid team we have. The total force really is a way of life with us.

PEOPLE PROGRAMS

Finally, Mr. Chairman, let me say that our most important resources are people, just like the Secretary has mentioned. Without well trained, motivated, well led, quality people, we are wasting our money on all the hardware.

To realize the full potential of this force, we have to train and keep quality people. To do that we continue to emphasize the programs that the Secretary talked about, the quality of life people programs. We want to meet our commitment to the men and women of the Air Force and do what is right with them because they are the ones who really make it work.

We need your support to get the most capability out of our investment that you and the American people have made. We appreciate that support for a strong defense, sir.

ARMS CONTROL AGREEMENT

Senator STEVENS. Thank you very much, General.

I am surprised that a young man like you is ready to step down. That is a tough decision. I had not heard about that.

If there is no objection, we will impose a 10-minute limitation on each Senator. We will ask you to keep your responses short so that it can be a fair system. We will go back through that whole system again if other people have any further questions.

Let me start off by stating to you that Senator Rudman and I are just back from Geneva. I see some of the people who went with us to observe the arms control talks are here.

I only wish that the American public could see the behind-the-scene efforts of the Department of Defense in supporting the whole concept of seeking a new agreement which will bring about a radical reduction in those enormous costs of the missile systems that both sides are supporting now.

I want to thank you both for the efforts that the Air Force has put forward to assist in that. It is the most serious one in the world today.

IMPACT OF GRAMM-RUDMAN-HOLLINGS SEQUESTRATION

Mr. Secretary, we are looking at the impact of this Gramm-Rudman-Hollings sequestering. Will you be forced to renegotiate any procurement or any R&D contracts for 1986 as a result of the first sequestering?

RENEGOTIATION OF PROCUREMENT CONTRACTS

Secretary ROURKE. No, Mr. Chairman, to date we have not, but our people are still going through this in extraordinary detail. One would think that it would be a relatively simple thing to effect. It is not that simple from our standpoint.

The present indications are that we may not have to renegotiate. The bottom line is on the fallout and where those reductions and cuts and economies may be made. But the first indication we have had in a half dozen meetings is that we will not have to renegotiate.

AUTOMATIC SEQUESTERING AND DEFENSE BUDGET

Senator STEVENS. I am one who believes there will not be an automatic sequestering again.

Secretary ROURKE. I hope you are right.

Senator STEVENS. We will do our job and hit the targets we agreed upon.

ATF PROGRAM

I am concerned about this defense budget. We are told that your ATF program will be restructured now. Production will slip about 3 months. As we look at the 1987 budget, it looks like you have it back on schedule in 1987.

Is that right?

Secretary ROURKE. Not completely, Mr. Chairman. I must tell you that the position of the administration, and this is perhaps where I start to stumble, Senator Rudman, in your shadow, is wholeheartedly supporting your proposal. That proposal has been embraced by the majority of the Department of Defense, to include those who had views to the contrary. As we have discussed at an earlier time, they now stand up proudly and salute.

We observed and we honor, as Secretary Weinberger has pointed out, the extraordinary difficulties, and I am not going to replow all the ground that you have gone through in a thousand forums, with the absolute requirement for getting this bloody deficit out of the way and resolved.

To suggest that it does not create problems for the Department of Defense, enormous problems for the Department of Defense, is ludicrous. I would be foolhardy and less than the honorable person you have known over the years, to suggest that to you.

We will get the job done. We will accomplish the mission just as you did with the respective Services, with the tools, weapons, and people at hand.

When I first saw the various prognostications, many of which apparently came out of rumor control in Baltimore, as to how far we would miss the deficit targets, we set immediately to working out, as is our function, option and contingency plans. These plans covered how badly this will hurt us, how much it will set us back in terms of our strategic modernization and tactical forces. They were rather grim analyses.

We are going to do an honest job. We are going to do a job that will keep our mission in the accomplishable arena.

O&M SEQUESTERING CUTS

Senator STEVENS. When will we see the Gramm-Rudman sequestering cuts in O&M? We have not seen them yet.

Secretary ROURKE. You will see them right after this hearing, Mr. Chairman.

CELV PROGRAM

Senator STEVENS. Let me get to another thing. Last year we had a real problem about the expendable launch vehicles. The committee insisted that we provide the 10 expendable launch vehicles as backup.

Secretary ROURKE. And you were quite correct.

Senator STEVENS. God forbid that any of us thought we would face the problem that we faced with the Challenger.

We would like to know now, are those 10 enough? We have had some suggestions you might be scaling back at Vandenberg and you have some other options, but we ought to know. I guess what I am saying is, first, can we expect a supplemental funding request for the CELV program that we funded last year, and do you have any other alternatives available other than using those 10 that we already provided?

Can you reschedule your launches so that we wouldn't face a supplemental?

Secretary ROURKE. In answer to the last question, Mr. Chairman, no. It is an understatement to say that the entire program is under close scrutiny and careful analysis based on where we are as a result of the tragedy, along with what kind of alternate options we have under consideration.

As you know, Under Secretary of the Air Force, Pete Aldridge, was to fly in the next shuttle mission. Pete is now back with us. The entire future, obviously, is extraordinarily uncertain.

If there is any certainty that comes out of the picture, it is that delays are going to be experienced in areas, hopefully, other than defense. We are sympathetic with the non-defense missions that must be performed. But we are conscious that the Nation's national security interest must be served first.

As you know, under the law, the President, through the Secretary of Defense, has the option of displacing nondefense missions.

In answer to your earlier question, at first blush the 10 CELV's you have funded will not be enough. There is under consideration, and it will be coming to you at an appropriate time, a request for additional CELV's. There are existing boosters including decommissioned Atlas and Titans available. Some Titan II's could be used for small payloads beyond our current program plans; but these do not meet our total needs.

So, we will be coming to you with a comprehensive package. I suggest it might very well be in the form of a supplemental. Then comes the corollary question——

MULTIYEAR CONTROLS ON CELV

Senator STEVENS. Are you seeking multi-year contracts on the CELV?

Secretary ROURKE. We certainly will consider it.

Senator STEVENS. We would urge you to get us a supplemental if it is needed, so that we can really crank it in here in time. If it is going to be an adjustment for 1987, we ought to know that, too.

Secretary ROURKE. You should know, Mr. Chairman, that there is not an extraordinary amount of time that can be saved from a contractor's standpoint.

One of the first things we did, obviously, was to go to the CELV contractor and ask him how much time can we save, how many crash programs can we go on?

It would be foolhardy to anticipate anything better than 2 to 3 months saving on the CELV's.

B-1 BOMBER

Senator STEVENS. Let me shift to these other two things. The first is the B–1. We keep hearing rumors someone will come up and ask us to keep the B–1 line open.

Is there any kind of plan under consideration in the Department of Defense that would request us to fund more than the original 100 of the B–1's?

Secretary ROURKE. None.

Senator STEVENS. Do you agree, General?

General GABRIEL. Yes, sir.

ANTISATELLITE PROGRAM

Senator STEVENS. In terms of the antisatellite program, you have an increase here in antisatellite R&D despite the ban that was placed on testing last year. Why?

Secretary ROURKE. Senator, there are all kinds of things that we can do and are doing on this side of the barn. As Secretary Weinberger has said, we will follow the law. As you know, there is a great amount of research and technology development that can and is being done.

We have under consideration, and it is presently in OSD, what other kinds of tests we can perform short of an object in space which is banned by the law and from which we expect to seek relief.

Senator STEVENS. We will go into that in a classified hearing and why a substantial increase in R&D on that item.

Secretary ROURKE. You will get good information on that score.

Senator STEVENS. Senator Proxmire.

QUALITY OF AIR FORCE PERSONNEL

Senator PROXMIRE. Thank you, Mr. Chairman.

Mr. Secretary, General Gabriel, I appreciate the fact that both of you gentlemen have stressed the improvement in quality of personnel in the Air Force. I think that is correct. You deserve a lot of credit for that. It is more important than any other element in the armed services operation.

People count. We lose sight of that with modern technology being so dazzling. I think the improvement is to your credit.

DEFENSE BUDGET CUTS

I should like to follow up a bit on the first part of the question that the Chairman asked. I think it is obvious to everyone that the Department of Defense budget will be cut and perhaps cut severely this year.

If the sequester order goes into effect, as the Chairman says it will, and I hope it will not, but I think it very well might, if that goes into effect, it goes into effect, as you know, next October. That is only 7 months away.

DOD's budget authority could be cut by $49 billion. That means the Air Force budget authority might have to be cut by perhaps over $15 billion.

How would you propose to meet that?

FISCAL YEAR 1987 DEFICIT REDUCTION

Secretary ROURKE. With great pain. We would not, since we have no intention or desire, Senator, cast a negative light on the effort which has been put forth by your colleagues, by the President, in support of this program for deficit reduction. The general guidance I might tell you quite frankly, that we have received is to not go to extraordinary lengths to weep and wail and cast gloom upon the result that would fall to the Department of Defense and each of its Services in the event the triggering mechanism goes into effect.

But we must, for the same reasons I suggested earlier and the reasons we are so highly paid, analyze what the prospective results of those various levels of cuts will be. We have done that.

We have been weeping and wailing, as you know, for the last 5 years. I can recall those days, sitting one row to the rear from here with Secretary Weinberger, when you said you were going to cut $300 million. We suggested the whole world would fall apart and we would have to disband the Third Marine Division and lay up ships and do a lot of things. When those cuts did come, we sat down at night and found ways to take the cut, with the assistance of some members of the committee. So, we have lost some credibility.

One of the things we did not want to do at this time, but we did anyway, has been to make a close analysis within the Air Force as to where and when those cuts will come. We have taken a first look at those possibilities and they are rather shocking. But then things are tough all over.

There are members of the panel who served in combat. If you are a battalion commander and one of your companies is wiped out, the other companies do not give up, they pull together and try to accomplish the mission.

Hopefully the triggering mechanism will not go into effect. That is the plan of the President and he has a certain uplifting quality to his vision and his direction and we are backing him all the way.

If it does, we will have a program to absorb those cuts in a manner that will protect the national security interests. When we have gone down this list with some specificity, and at this stage it is only a notional list, we will not find the kinds of items Secretary Weinberger found and used with some facility and great criticism during the first 2 or 3 years of this administration. When the cuts came, even though we weeped and wailed about the things we would have to do, we wound up adjusting the economic inflator and fuel allowances and absorbed those cuts in a manner that did not really hurt us.

NATIONAL SECURITY

Senator PROXMIRE. Mr. Secretary, you have had nothing like the cuts I am talking about here, nothing like a $15 billion reduction.

Secretary ROURKE. Absolutely.

Senator PROXMIRE. In specific terms, do you think that we could make these reductions without reducing national security?

Secretary ROURKE. No, I do not.

Senator PROXMIRE. When you say no, you do not think so, does that mean if we make those cuts, it will reduce our national security?

Secretary ROURKE. That is correct. I do think we will injure national security. We have said, and you have heard it a number of times, we will make whatever cuts are required by the Congress and the President. As a result, we will be a little less ready, or maybe a lot less ready the following day than the day before the cuts.

Nobody is leaving the building. We might have to change some mission responsibilities. We might have to look at some areas of the world that we will not be able to apply ourselves to with equal force.

We might start thinking more about America and the harm, if you will, to some or our allies. But those are all heavier considerations that you gentlemen will get into also.

Clearly and simply, you do not make cuts of that magnitude without impacting seriously on readiness and on our forces.

IMPORTANCE OF ASAT

Senator PROXMIRE. What we keep hearing is that the Air Force does not want the ASAT program. The system capabilities currently funded are too limited to be of much value to the Air Force and those capabilities are far outweighed by the assets of the Soviets in a full-scale ASAT arms race with the Soviets.

I also hear that the only reason the Air Force is pushing the ASAT program is because it is a priority with DOD, but not with the Air Force.

Is that correct?

Secretary ROURKE. No, sir. That might have come out of the same rumor control in Baltimore that some of our earlier messages came from. As you are aware, these things are never unanimous or as contentious as the ASAT proposition appears to be. The Air Force feels, as does Secretary Weinberger and the President, that we simply cannot afford to let the Soviets enjoy a sanctuary in space. We must remain competitive and must meet the threat. This capability is critically important against Soviet space targeting systems.

The Air Force is convinced, although this is a costly program, it is one that we have to be competitive in. Given the approval and cooperation of the Congress, we intend to move out smartly on that.

COST ESTIMATE OF ASAT PROGRAM

Senator PROXMIRE. As I recall, the Air Force is projecting a 33-fold increase in spending for antisatellite weapons for the next 3 years. That is a staggering increase as the Defense Department begins to face the cuts that you may face.

Can you give the subcommittee the current cost estimate for the entire program, both R&D and production cost on completion and how does this estimate change from the complete cost estimate in 1983?

Secretary ROURKE. We will provide that for the committee. You must understand that we start from a very low base. When you say we have a 33-fold increase, that figure might be accurate. But when you consider the base from whence it comes, it is not that staggering.

In the race for space, and I do not like to put it that way because we almost trip into the militarization of space argument, all we are looking for is the avoidance of giving the other side a sanctuary or giving them an advantage in space.

We observe, with some worry, that they have tested, we are told by our intelligence people, some 20 times in space. That is disturbing to us. They have a system, we do not. Some call it a rusty system. I do not know what that means, Senator, other than they have tested it 20 times and have a capability that we do not.

So, we consider it very important. It provides the kind of background protection for our people and weapons systems. We need the information derived from our satellite sources and we don't want our sources blinded by the other side without being able to respond in kind.

[The information follows:]

PROGRAM COSTS ON ANTISATELLITE WEAPONS

A detailed comparison of our current cost estimate with that proposed in 1983 is as follows:

[In millions of dollars]

Category	1983	Current
R&D	$1,350	$2,128
Missile procurement	2,308	1,533
Aircraft procurement	288	142

The reasons for these changes are provided below:

a. R&D. Approximately $115 million of the development funds were transferred from the North American Aerospace Defense Command Cheyenne Mountain Complex (NCMC) Program Element to consolidate the overall program. The remaining $660 million was added to implement a production transition phase which resulted from an independent review performed last year and several previous recommendations from Congress. The production transition phase will incorporate changes/upgrades to make the system more operable, supportable and producible.

b. Missile procurement. The funding reduction is due to a significant decrease in the missile quantities being procured from [deleted] however, the cost per missile has increased from [deleted] due to a less than optimum production profile and inflation adjustments.

c. Aircraft procurement. The funding reduction is due to a significant decrease in the number of sets of Carrier Aircraft Equipment (CAE) from [deleted]. Again, the cost per unit has increased due to a less than optimum production profile and inflation adjustments.

PRODUCTION OF ASAT MISSILES

Senator PROXMIRE. As of this year, fiscal 1986, how many ASAT missiles does the Air Force now propose to produce under this program?

Secretary ROURKE. [Deleted.]

Senator PROXMIRE. Previously how many ASAT missiles did the Air Force estimate would be produced in the program?

Secretary ROURKE. General Gabriel tells me [deleted].

Senator PROXMIRE. In 1983, what was the proposed total production cost of missiles for the ASAT program?

Secretary ROURKE. I will have to get those figures for you.

Senator PROXMIRE. Also, if you can get together for me the current estimate of the total cost per production missile?

Secretary ROURKE. I will do that.

[The information follows:]

PRODUCTION COSTS FOR ASAT

In the 31 December 1983 Comprehensive Selected Acquisition Report, the proposed total production costs of missiles for the ASAT program was $2,308 million. [Deleted.]

[Deleted.] The big increase from [deleted] in 1986 is primarily due to the significant reduction in procurement quantities and the inflation effects of delaying production start.

ASAT PRODUCTION SCHEDULE

Senator PROXMIRE. Can you talk about the production schedule for the ASAT? When do you expect to have a full force and has the production schedule changed over the past several years?

Secretary ROURKE. Senator, I will have to provide that for the record. All I can tell you is from my observations in the last 2 months and the coordination that we have enjoyed with the Office of the Secretary of Defense, the Under Secretary, and Assistant Secretary who has that responsibility, I haven't seen any diminution in the level of support from Air Force people.

It will not happen on my watch, if indeed diminution is detected. My hearing is still relatively good and the observations that I obtain from Secretary Weinberger and the President are very clear on this issue and I intend to execute on those instructions.

[The information follows:]

ASAT PRODUCTION SCHEDULE

The ASAT Program documented in the FY 87 President's Budget has been significantly restructured as a result of an independent review conducted last year and several previous recommendations made by Congress. We are currently procuring [deleted] under this revised program to address the near-term threat. For the far-term threat, we are investigating other technologies in addition to the air-launched system which could provide an ASAT capability. We expect to make a decision on this far-term force structure in the FY 90/91 time period. The restructured program also adds a production transition phase to make the system more producible, supportable, and operable.

As a result of these changes, production will now start in FY 88, with long lead procurement to be initiated in FY 87. The [deleted].

There has been a significant change in the production schedules from the previous year. A detailed comparison of the schedule in the FY 86 President's Budget, and the current schedule is provided below:

Year	FY 1986 PB	FY 1987 PB
1985	[Deleted]	[Deleted]
1986	[Deleted]	[Deleted]
1987	[Deleted]	[Deleted]
1988	[Deleted]	[Deleted]
1989	[Deleted]	[Deleted]
1990	[Deleted]	[Deleted]
1991	[Deleted]	[Deleted]
1992	[Deleted]	[Deleted]
Total	[Deleted]	[Deleted]

POLICY REGARDING QUESTIONS FOR THE RECORD

Senator PROXMIRE. My time is up. The Chairman of the Committee told me this morning; he intends to establish a new policy on the number of questions submitted. That policy would include, I think very wisely, an estimate of cost of answering the questions.

I am tempted to ask for more, but I am going to ask the Chairman unanimous consent to ask two questions, not two topics, but two questions, two interrogatories so that you can answer them for the record.

Secretary ROURKE. Yes, sir.

Senator STEVENS. We will be delighted to do so. I have discussed with the Secretary and General Gabriel what I proposed to do. I propose to see if we cannot do it for the Congress as a whole and that is to require that the person that is asked to respond to questions submitted in writing give a cost estimate and manpower estimate of the time involved.

We are getting tired of all the questions submitted. Responses come back and they go into a printed record. No one ever reads them. My good friend is not the type to do that sort of thing.

Senator, we welcome your questions.

Secretary ROURKE. If I might comment briefly. My concern is, and I have observed it from the DOD side now, as I was on the congressional side for 18 years, that there is a reduction in the quality of response when the numbers of questions are so horrendously increased.

Senator STEVENS. We find instances where the committee had a whole series of questions submitted in writing by members that were redundant. They did not know that they were redundant. They did not understand that they have variations.

Senator Rudman.

Senator RUDMAN. Mr. Chairman, I was going to suggest under the sequester this year, maybe we ought to, say, answer 95.1 percent of each question.

Mr. Chairman, could I yield to my friend from New York.

Senator D'AMATO. Mr. Chairman, I would like to welcome my good friend, Secretary Rourke. We have had our exchanges, our differences, but he is certainly dedicated to the task as Secretary.

T-46

Mr. Chairman, not to fly in the face of what you are attempting to do, I would like to leave several questions for the record for Secretary Rourke. I assure you that I think there will probably be very few, if any, in the entire Senate who will be raising questions that have to do with something called the T-46.

I have had occasion to speak to the Secretary about that. I am wondering if that would be appropriate and ask the Secretary to give us some answers with respect to what program levels might be established at a minimal production level, what the cost will be.

Senator STEVENS. Of course, I have no way to object to your questions and you may submit them. I am requesting the Department of Defense to notify me, if any question submitted by members of the subcommittee will take more than 2 man-hours to respond to. If it does, I think we ought to know the cost of those questions.

We will point that out to the Senator who asks the questions and see if he really wants to increase the manpower of the Department of Defense for that purpose. I think four to six questions ought to be pretty quick.

Senator D'AMATO. I do not think it will take too long.

Senator STEVENS. This is a budget overview. We will get into the details later. We will welcome your questions at that time, too.

Senator Rudman.

THE ECONOMY AND THE DEFENSE BUDGET

Senator RUDMAN. Thank you, Mr. Chairman.

Mr. Secretary, I join everyone in welcoming you to the hearing. We want to work with you and have the utmost respect for you.

Let me say in response to your opening statement, which I certainly concur with, that I think you should look at history.

The greatest threat to the armed forces budget will come if the country has serious economic problems. That has happened before in General Gabriel's career. One need only look at the history of the Air Force from post-World War II to post-Korean War to see how we savaged those defense budgets and left ourselves totally unprepared. Political priorities were somewhere else; in many cases the economy was in a downturn.

Last year—a time of prosperity and low inflation—we finished with a deficit of $220 billion. When we look at the total of the Department of Defense budget, Social Security, Medicaid budget, and interest we are left with only $180 billion for the rest of the Government. Combine that with geometrically rising interest rates and we have to say it is time for this Congress, administration, and the Defense Department to take the bull by the horns and do what has to be done.

I do not believe the Defense Department budget ought to be savaged by the operation of the Gramm-Rudman-Hollings law. If it is, it will be a sad thing, because it will mean the American people, through their elected representatives, do not care about national security. I hope we do not mean that.

Turning to the things that the Department can do, the authors of this legislation hope it would force a good strong look at the internal management of the armed services themselves, not necessarily in the kinds of cuts the Congress tries to make.

Quite frankly, I do not think we can manage the Defense Department, although some of us try. Only you can manage the Defense Department. You have forgotten more about it than any of us will ever know.

Has there been made an effort to look at management to determine if there are ways and means of doing what you do with fewer people, with less overhead, at less cost?

JCS REORGANIZATION

Secretary ROURKE. Yes, there are. If I may comment first, General Gabriel.

The Air Force has actually cut its headquarters staff operation. I will not be so bold as to suggest now we are leaner and meaner, but that is the net of it.

General Gabriel and Secretary Orr worked very hard and succeeded in beating the bureaucrats, in and out of uniform, who are in the business of layering and all those kinds of things that have negative impact.

I am not certain we will have a complete say in that business ourselves. I testified yesterday afternoon and General Gabriel testifies this afternoon before a House Committee on the subject of reorganization. You and your colleagues are very serious about reorganization. Obviously, there is some dissatisfaction with the degree to which those changes have been accomplished.

The Packard Commission report, now delayed, will come out with an interim report at the end of this month and a final report in the June or July sector. I think for the first time in this administration, with the assistance of the Congress, there will be necessary changes proposed and accomplished. I am convinced there will be.

But we appear as two old goats never wanting any change in their barnyard, upholding the fact that we have always done it this way. The true bureaucrat says, "We have never done it that way before." Well, we are going to be doing things differently judging from the size and scope of the legislation under consideration. It's going through markup in the Senate now and indeed will be quickly in the markup stage on the House side, in the next 2 weeks.

We are going to be looking at some rather drastic changes. The bottom line is, in my view, and I think General Gabriel shares this view, there are only so many things you can do with a wiring diagram. If you do not, as you have observed yourself, as the Chairman has observed, fill that wiring diagram with good people, in and out of uniform, the wires can run all over the lot and it doesn't mean a thing.

I agree with certain organizational changes. We will agree, not too enthusiastically, with some of the suggested restructuring. But what I plead with the Congress to do is assist us in creating a mechanism that draws better people to these jobs. We are lucky to have people of the quality of General Gabriel and Admiral Crowe and others to stick with this operation for 30 or 40 years. Indeed, some on the civilian side, including myself, merit somewhat less sympathy because we are not committed for a lifetime. Financially and psychologicially, we are passing through the scene.

We have to insist on creating a system that makes it more competitive. If you have poor managers, you can take a wiring diagram and throw it away.

SOLUTIONS FOR INTERNAL REORGANIZATION

Senator RUDMAN. It seems to me it would be a terrible shame if the Services tried to improve the tooth-to-tail ratio of our armed services under these budget constraints.

I recognize the Air Force is different because of the technological nature of its equipment. It just seems to me, Mr. Secretary and General Gabriel, that the greatest thing that the Defense Department can do and the Air Force can do for this Congress and this country is to come to us with your own ideas of how to become leaner and tougher.

It is like Proposition 2½ and 13, and so forth; the first thing you heard from the bureaucrats was we are going to close the schools, close the Police Department, shut down the Fire Department. Nobody talked about taking away the mayor's limousine.

It is important that the Department come up with some of its own solutions because if you do not, somebody else will and I am going to bet those solutions will not be as good as solutions that you could come up with, yourself, in terms of internal reorganization.

General GABRIEL. A couple of comments. One thing is, the new systems we are building today are a lot less manpower intensive. The F–16 requires one-half the maintenance manhours per flying hour of the F–4; the C–17 requires one-third the maintenance manhours per flying hour of the C–5. Reliability and maintainability are built into those systems. The A–10 is also very reliable and maintainable. This reduces the tail you talk about that we need to support these aircraft. Also, for the increased responsibilities we've taken on, we should have needed about 9,100 active military and 3,600 civilians this year in additional manpower. Through management efficiencies, and whatnot, we've got that number down to 700 active duty and 1,600 civilians and are driving to get to zero.

We have force structure growth, but we are taking resources out of our hide someplace else. Host nation support helped us in Germany and other places. The reserve forces are picking up as much as they possibly can and they are doing a good job. There are a number of ways to get the most out of our resources.

I have functional reviews going on. Management teams are going out and taking looks at headquarters or units and saying: OK, let's run the drills on each one of the jobs. Can they do it better? In some areas, we've had too much specialization. As a result, we weren't fully using our people to do the jobs for which they were trained. We are changing those things, especially in the maintenance and sortie generation area, to make them more efficient. We are making savings. It is painful and slow, but we are doing that.

FORCE STRUCTURE IN NATO

Senator RUDMAN. I appreciate that, General.

I also recognize changing bureaucracies is not easy, even though you wear four stars and the man on your left has the title of Secretary. Anybody who does not, certainly does not understand large bureaucracy.

I continue to believe if we are to have a strong defense, we will have to do something differently from the past.

I am not going to ask you questions for the record on Stealth. I am looking forward to the classified hearing on Stealth that I understand the chairman is preparing.

NATO PERSONNEL FORCE STRUCTURE

The last question I have: Do you have a study going on in the area of personnel utilization looking at your force structure in NATO which is a growing concern in the Congress?

The Chairman uses a figure of $80 or $90 billion net as the NATO commitment costs. It certainly is a great deal of money. We have infrastructure, dependents, dependents' housing, shopping centers, and golf clubs, all designed to make quality of life better. I do not disagree with that.

Are we looking at ways in which our NATO deployment of Air Force can become more efficient?

Secretary ROURKE. The short answer is yes. The number Serviceswide, 326,414, comes to mind and the Chairman has impressed us mightily for the last 3 years with the importance of being more efficient. We are constantly doing that.

REAL ACCOUNTABILITY FOR DEFENSE DOLLARS

Senator RUDMAN. That light stops you as well as me.

Senator STEVENS. Senator Andrews.

Senator ANDREWS Thank you, Mr. Chairman.

Mr. Secretary, it is good to have you here. Two weeks ago Secretary Weinberger presented the fiscal 1987 Department of Defense budget to the Senate Budget Committee. That budget called for new budget authority for fiscal 1987 of $311.6 billion and outlays of $278 billion.

Mr. Secretary, more than ever before the Defense budget is tied to all other budget functions. This year I am certain the Congress will demand real accountability for our defense dollars.

In my initial review the Air Force budget leaves the impression that the Air Force increased or I guess in your terminology rubusted its programs to come up with the dollar amount allocated to the Air Force by the Secretary of Defense's office. I would like to cite three examples that tend to support that impression.

MX MISSILE SPARE PROCUREMENT

First, the procurement of MX missile spares. Congress provided guidance to DOD to purchase 12 instead of 21 MX spares for fiscal 1987. The President's budget is a maximum 21 spares. I believe we have to review the whole MX spare missiles. You know, quite candidly, I am not sure we have to buy 143 MX missiles just to support a deployed force of 50 MX's.

Just reducing MX spare procurement from 21 to 12 in fiscal 1987 will result, I am told, in a $600 million reduction in budget authority. Also I am questioning the tooling up and then dropping back which costs so much more over uniform production.

FIGHTER AIRCRAFT PROCUREMENT

Secondly, Mr. Secretary, the procurement of fighter aircraft. The President's budget would purchase 216 F-16 fighter aircraft at a cost of $3.923 billion. This represents an increase of 36 F-16's from fiscal 1986 at an increase of $639 million.

AIR DEFENSE COMPETITION

The third example involves the air defense fighter competition mandated by Congress. I am extremely disappointed to hear that the Air Force will not be able to meet the July 1, source selection date for the air defense fighter.

Nevertheless, the President's budget contains $447 million in fiscal 1987 for the purchase of 20 of the aircraft that wins the fighter competition in addition to $192 million appropriated for fiscal 1986 except in the fiscal 1986 test competition, I am not aware of any agreement, implied or otherwise, that the air defense fighter aircraft would be in addition to the 228 fighter aircraft purchased in fiscal 1986.

These three examples, $600 million for MX spares, $639 million for an additional 36 F-16's and $447 million for air defense fighters, total $2.7 billion.

RESEARCH AND DEVELOPMENT ACCOUNT

In addition, the President's budget shows a fiscal 1987 increase of $3.5 billion in the Air Force research and development account. Without considering the underpricing in the defense budget identified by CBO, it appears to me that the Air Force portion of the defense budget faces a reduction of approximately $8.5 billion for fiscal 1987.

That means that we are going to have to work together closely in the next few months to make sure our legitimate defense requirements can be met. Questionable programs will have to be limited so that we can operate within the fiscal constraints we face.

COMPETING F-20 OR F-16

Since the Air Force program envisions putting the F-16 in the defense role, it seems you have made judgment that tactical fighters are capable of performing the air defense mission.

Have you given thought to competing the F-20 or F-16 for the 180 or so of the low end of the high-low mix of tactical fighters?

Secretary ROURKE. That is quite a plate-full.

Senator ANDREWS. I gave you a plate-full and than I asked you the specific question.

PEACEKEEPER PROGRAM

Secretary ROURKE. Indeed I will respond very quickly, if I may, to the Peacekeeper missile discussion. As you know, our program, despite the attitudes of many members of Congress, whom I understand and respect, that from the Scowcroft Commission through the President, the Secretary of Defense and on down, was and still is for 100 Peacekeeper missiles.

I will not belabor the arguments on what is required to cover the targets.

Senator ANDREWS. The Congress said 50 and now you are coming back with 146 because you need spares.

Secretary ROURKE. The number for fiscal year 1987 is 21.

Senator ANDREWS. They are listed as spares.

Secretary ROURKE. They will be utilized as test missiles. Let me suggest to you that the most efficient production rate is 48. So, from an ecomomic standpoint we are on the low end of that scale, from a dollar savings standpoint.

PEACEKEEPER TEST AND EVALUATION

Talking about testing and evaluating, it is the best judgment of the Air Force that just for the 50 missiles that are approved to be deployed, and we think it takes 100 to cover the targets, we need another 123 missiles. There are folks who will be upset with us for that figure and our people——

Senator ANDREWS. You mean we are not talking about 146, but we are talking about 173 in order to have 50?

Secretary ROURKE. That is correct.

Senator ANDREWS. A fellow wrote a book called "Alice in Wonderland" on the basis of stuff like that.

Secretary ROURKE. It might be, but the 108 test missiles for test flights are intended to make absolutely certain that if and when these 50 are called upon, we want to be certain that it is going to work, it will hit its target, it will accomplish the national security mission that is assigned to it. It is a tough, costly, expensive business, as indicated perhaps by the recent shuttle tragedy, when we utilize one of these 50 missiles.

There are those—you are not one—that suggest 108 flight tests missiles are too many. We will be happy to provide you with that detail.

Senator ANDREWS. I appreciate the extra detail because the 108 missiles we buy in order to have 50 that we can shoot offends this farmer's sense of what cost effectiveness is all about.

Secretary ROURKE. CBO, by the way, agrees with our figures and it is just for statistical analysis. As General Gabriel points out, there are fewer test missiles.

Senator ANDREWS. Maybe you ought to get a better warranty on the first 50 missiles. The Air Force is putting the warranty into effect. Now you need all these spares, 123 spares for the 50.

Secretary ROURKE. The warranty is a great idea.

Senator ANDREWS. Are you saving a lot of money on the warranty?

Secretary ROURKE. We are.

Senator ANDREWS. That is right. I love you for saying that.

Secretary ROURKE. In a nutshell, we will have fewer test spares than we utilized for Minuteman II and III. The CBO, which has not always been an endorser of Air Force programs, subscribes to the requirement for the 108 test missiles.

AIR DEFENSE FIGHTER

One item I had better clear up is on the air defense fighter. We have not indicated in any sense to the Congress that we will not make or be able to make the July 1, date that has been required by law for the air defense fighter.

What we have indicated, Secretary Weinberger in response to communication from Chairman Goldwater, was some of the problems that might be encountered in doing a job on that kind of time schedule.

We met with General Skantze, as you know, the head of the Air Force Systems Command, and he has indicated concerns. It is a little simplistic for people like me to point out that there are only two or three competitors in this thing, it is a paper competition and that I can make up my mind by Tuesday. It is a little bit more difficult than that.

I have to be careful as I tread into these things since I am going to be source selection on that issue. Once one has had the benefit of the problems and the fairness inherent in an expanded competition program, we are concerned we might not achieve the benefit of fairness if we have to do it by July 1.

What General Skantze laid out is, I think, a very effective presentation since this is going to be very competitive. That is the name of the game. That is the way we want it. Some of the competitors are probably sitting in back of me. We want to do it right. We want to give everyone a fair opportunity, a total shot at this thing. When you lay out the whole RFP process and evaluation process, the draft RFP's just went out within the last week. There is another time line that follows the formal RFP.

AIR FORCE FIGHTER COMPETITION REQUIREMENT

Senator ANDREWS. I understand that problem. Let me get in one other quick question.

Industry sources are saying although the competition to sell the Air Force 300 fighters is open to any company, only Northrop's F–20 and General Dynamics F–16 will meet the competition requirement. Is that accurate?

Secretary ROURKE. No, sir, not to my knowledge. The competition requirement was laid on us and it is the manner in which we intend to approach this. If General Gabriel has any suggestions to the contrary, I will be happy to hear them. This is a free and open competition.

THREAT ASSESSMENT

Senator ANDREWS. Are you aware of any efforts to adjust threat assessment in order to get the F–20 and F–16 for the competition?

Secretary ROURKE. No, sir.

Senator STEVENS. Senator Cochran.

Senator COCHRAN. Let me congratulate my friend, Russell Rourke, on being here today in his capacity as Secretary of the Air Force. This is my first opportunity to commend you on the job you are doing as our new Secretary of the Air Force.

MULTIYEAR PROCUREMENT OF F–16'S

Secretary ROURKE. Thank you, sir.

Senator COCHRAN. General Gabriel, it is good to see you, too. I congratulate you again on another football year for the Air Force. The last time we were together for a period of time we were soaked seeing the Air Force Academy defeat the University of Mississippi. We did not go to the bowl game this year, but you did. Congratulations.

You were talking about the competition on the fighters. What effect does the multi-year procurement and the addition of 36 F–16's have on your plans for competition? Will they be included in the competition, too?

Secretary ROURKE. No, sir. The air defense fighter, despite some suggestions to the contrary, is separate and apart from the 216 F–16's in this mix referred to earlier. In the air defense fighter competition we are looking at 20 for this year and then stretching out 60, 60, 60, 60, a total prospect on the order of 270 over the 5-year defense plan.

AIR FORCE RECRUITING AND RETENTION

Senator COCHRAN. I notice in a recent newspaper report that the Army did not reach its target for recruiting in December. In your statement you talk about the importance of your people, recruiting, retention, and the quality of life problems that people have when they are in the military, including constant moves.

What is your experience to date with your recruiting? Are you maintaining levels of recruiting and retention which you think will provide you with the numbers as well as the quality of people to do the job the Air Force is called on to do?

Secretary ROURKE. Absolutely. I know General Gabriel is bursting with pride on this subject. So, I will let him respond.

I must point out that we have an enormous problem in the Air Force in recruiting and retention; that is, being able to provide slots for all the top quality people who want in and want to stay in. It is a happy problem to have.

It is disconcerting when you cannot accept everyone who wants to serve in your force. It is an enormous success story. In our recruiting we spend less per individual than any of the other Services. That is not intended to denigrate them, but the Air Force is a very attractive place to serve in our society.

PILOT RETENTION

The only warning light that has come on at all is obviously in the area of pilot retention. You know all those numbers. From a high of 72 percent in 1983, we are down to 59 percent now. We are not in a pinch. We understand the competitive market. We understand the private airlines and how they hire and how they are hiring more in the current cycle.

That gives a small warning light. We are extraordinarily enthusiastic about recruiting and retention at large. We have run models and analyses of when a pilot or crewmember gets out. Why are they going? What has prompted them to make a change in their career pattern?

I must point out near the top of the list, and General Gabriel and I just finished a conference last week—Charlie, I would like you to speak. I am probably going to exhaust the subject.

INCENTIVE PAY

Senator COCHRAN. I am not going to have a chance to ask you another question either.

Secretary ROURKE. Let me say we are looking at it closely. We are looking at the incentive pay that worked so well the last time.

Senator COCHRAN. General Gabriel.

AIR FORCE RETENTION

General GABRIEL. We are concerned about the future. We have seldom had trouble with recruiting. We have in the bank officers and enlisted in all fields, but retention has been the problem. We are down now to a 59 or 58 percent cumulative continuation rate on pilots. That is not a problem. We can deal with that and we have.

But the future is going to depend on the economy and the reduced number of 18-year-olds. We have been forecasting gloom and doom in the past. That has not happened yet. Some of the trends have been down. We are concerned about keeping the quality of life high out there and giving the troops enough parts and spares and flying time so that the maintainers do not have to work overtime and the crews get enough flying time to be able to do their jobs.

DENTAL CARE FOR DEPENDENTS AND RETIREES

Senator COCHRAN. I notice in your statement, you specifically refer to providing some emphasis on quality of life issues such as the burden of permanent change of station moves and providing dependents' dental care.

What is the outlook with the budget that you are submitting for our review this year with respect to providing dependents' dental care for both dependents and retirees?

This is an issue of interest I know to retirees as well as dependents.

Secretary ROURKE. The dependents' dental care is the single most important dependent health issue that we have to move forward on, Senator. Again, in those surveys I spoke of earlier on why people stay in and why people might contemplate getting out, dependents' dental care has been an important issue.

It might not seem so to the public at large, but it is very important to military service personnel to have that available at an economic cost and in a sharing manner. That is why it has achieved the status that it has in our current budget cycle.

PCS TRAVEL REIMBURSEMENT

On PCS, prior to some corrective legislation taken by the Congress last year for which we are grateful, it was the rule that an individual, and obviously it was different for one person as opposed to another, would pay $4 for every dollar the Government reimbursed for travel. As a result of the actions the Congress took last year, that ratio is down to $2.8 out of his own pocket for every dollar expended.

So, there are other issues like that in the quality of life arena that I am fearful that in this current cycle are going to go begging. They include family housing; they include an adequate retirement program; they include adequate pay. They include not just those things that make people feel warm and fuzzy, but those things that help get the job done and that is the availability of spares and flying hours and good training, and so on.

These people are not in it for a nestling program. They are in it to contribute to the defense of their country and at the same time do something for their family.

SAFETY RECORD OF THE AIR FORCE

Senator COCHRAN. One other quality of life issue which you identified in your statement is the potential for risk of personal injury or death. This is something that is a consideration for young men and women coming into the Service-thinking, am I going to get killed riding in an airplane?

I think the safety record of the Air Force is something that you should tell us about. I understand it has been excellent. We are looking at airline safety now, with more and more people being concerned about this. Because of not only the shuttle accident, but also the Gander, Newfoundland, accident and others that occurred this year, they focus attention on the part of our citizens on this problem.

What is the effect of the budget going to be on your ability to help safeguard the men and women in uniform, to protect their lives and protect them from injury as they go about their training mission and the operational activity of the Air Force?

Secretary ROURKE. If I can quickly point out, and I know General Gabriel wants to comment on this area, he has indicated that last year was a record-breaking year for safety. Our mishap rate per 100,000 flying hours was 1.49.

What strikes us as being so important in this arena, we could all lay back in the barn and reduce very rapidly the number of mishaps by not having any flights. That would be easy to do.

The problem is that to be effective in war, we must train realistically in peacetime. Combat experience indicates that a pilot gets into trouble a disproportionate amount on his first 10 missions in combat. That is where he has the greatest risk of being knocked out of the sky.

REALISTIC PILOT TRAINING

The Air Force intention is to give him the best, most realistic training possible. Realistic training means we run some risks in that area so that a pilot experiences those 10 missions before he faces the enemy in combat.

Senator COCHRAN. Any other comments on this subject?

General GABRIEL. Our exercises at Nellis and elsewhere are the most realistic possible to let our pilots know what the environment is like so if they are ever challenged, they will feel they have been there before. We are trying to cut out all the surprises possible if they have to go to war. That realistic training keeps them in. They know they can do their job.

Senator STEVENS. Senator Sasser.

SENATOR NUNN'S AMENDMENT

Senator SASSER. Thank you, Mr. Chairman.

By implication, Senator Rudman was expressing, as I interpreted it, some concern about the cost of maintaining our commitment to NATO. I am concerned about that and have been for some time. Last year our European NATO allies provided an average of only 3.8 percent of their Gross National Product for defense while we in the United States were providing 6.5 percent.

In other words, they were making, based on GNP, only 60 percent of the effort that we were making here in the United States for the common defense. We find ourselves coming up on a half century after the Second World War with about 300,000 troops in NATO in Europe with 10 Army Divisions dedicated to be moved as rapidly as possible from the Continental United States to the defense of Europe should we get into a war situation there.

Now we are also faced with the problem that whenever we in the Congress attempt to send some signal to our NATO allies that we feel they are not doing enough, and I have in mind principally Senator

Nunn's amendment that he sought to offer last year, giving the NATO allies plenty of time, ample notice, that if they did not do more and meet certain minimum requirements laid out in his amendment, that we would start reducing our troop strength in Europe, not by a great number, but reducing it, as I recall, by something like 15 percent, 10 percent of the total force there.

When that amendment came up for debate, the Department of Defense was over here talking to many of us telling us that that would be a disaster and we couldn't do that, that would send the wrong signal to our NATO allies, et cetera, et cetera.

NATO DEFENSE EXPENDITURE RATES

Now, I might address this question to both of you. In your view, what steps do we need to take to convince our allies that defense expenditure rates of only 60 percent of the rate of the United States are not acceptable or do you find that acceptable?

Secretary ROURKE. Senator, it is not acceptable. I know I am getting too old in this job because I remember working here on the Hill when Senator Mansfield was doing about the same thing that we were all trying to achieve. We have had disputes with the chairman of the committee on this subject for the last 5 years, the debate being obviously how do you get the other fellow to come to the pass and how do you get him to contribute more?

Do you do it in a threatening way by laying down the gauntlet or doing like Cap Weinberger, the President, and Secretary Shultz and others have done in the many meetings that we have had and interchanges by uniform personnel in Europe?

Certainly we want them to do more. We want them to do more in the Far East.

Senator SASSER. Mr. Secretary, the Japanese have a better excuse. They say that General MacArthur wrote it in their Constitution that they could not really contribute much to their own defense. Some of us sometimes late at night are relieved that those Toyota assembly lines are producing automobiles rather than tanks.

Secretary ROURKE. If you talk to the Australians and New Zealanders, as we have on various occasions, and some members of the committee have also, their responses are interesting in that regard. The problem, as you correctly suggest, in Europe is somewhat more unique.

Certainly with the passage of 3 years, 326,414 is a lot of people. We do have the top line that says we have a vital interest involved in that area of the world and, not to suggest the old argument that would cause such a flap in the paper and with some of our European friends, that is where we intend to fight the next conventional war. Then you have another set of arguments that spring out.

We would like them to contribute more to their own defense and not in the diplomatic, cookie pushing way, but in the hard number standpoint. We are talking to each of our European allies, discussing our enormous number of problems and talking about the threat of Gramm-Rudman.

We have to do more. The threat is greater to our European friends than it is to us. We have met every one of those military leaders as well as civilian leaders and we are trying as best we can to get them to come to the table with more money and more people. It is not an easy effort, but it is one that we are plugging away at.

REDUCING FORCES IN EUROPE

Senator SASSER. Mr. Secretary, I see now that our NATO allies are starting to get cold feet on the question or at least from news accounts they are getting cold feet on the possibility that we might reduce the INF forces in Europe. Some of them are saying, wait a minute, maybe we do not want to go to this zero option that the administration proposed previously and Mr. Gorbachev seems to say might not be a bad idea.

They say we do not want to get nine nuclear weapons out of Europe because we do not have the capability to withstand a conventional attack. What is wrong with going the Sam Nunn route and giving them a timetable?

Say you either meet these minimum requirements or we are going to start reducing our force structure in Europe and we are not going to risk getting into a nuclear war in Europe because you will not make the proper contribution to having a conventional force that we need to deter Soviet aggression.

Secretary ROURKE. That is one way and it is one way that has a lot of support in the Congress and a lot of support in the hinterlands. We hear it all the time. This administration does not happen to believe that is the way to do it. Our concern is that they might, and I can get into an argument with the chairman on this, they might call our bluff and we might pull our people out and then where are we?

I suggest we can get to that same goal, not with the diplomatic, cookie pushing, but with some good tough bargaining. You might suggest it is not a bluff at all, "We have helped you long enough. Goodbye."

I do not think that would be in the best interest of the United States. It would not protect the vital interests I spoke of earlier. We will try it the hard way for a little while longer.

CRITICALITY OF U.S. INTERESTS IN PHILIPPINES

Senator SASSER. Regarding the Philippines, many of us believe the longer Marcos stays in power, the more our bases will be jeopardized. It is not lost on some of us that Tass was the only newspaper that congratulated and celebrated President Marcos' reelection. The Soviet Ambassador was the first to call and congratulate him.

The fear is the longer Marco stays in power, the more fuel this feeds to the growing insurgency there of the National People's Army.

The question I would like to ask you, Mr. Secretary, and perhaps General Gabriel, who I suspect has served there, how critical is Clark Air Force Base to U. S. interests in that region of the world and is there, in your judgment, a reasonably satisfactory substitute that might be less prone to our being run out later on.

Secretary ROURKE. Senator, I have been there, too, on a number of occasions. I have participated in a number of the discussions that have occurred over the last several months.

As the President himself has indicated in an extraordinarily difficult and delicate situation, we want to work with whatever Government emerges, however democratic or undemocratic it might be, after that process concludes.

Clark AB and Subic Naval Base are extremely important to us. They are vital to our interests in that area. There are other alternatives. They are not extraordinarily attractive as the map will clearly show. Not only from a distance standpoint, but in terms of where the other side is, what they have done at Cam Rahn Bay and all those things you are aware of. Also there is the additional cost.

If you think we have problems with Gramm-Rudman now, you should see the estimated cost of trying to duplicate those facilities in a place 1,000 miles away.

ALTERNATE LOCATION FOR CLARK AB

Senator SASSER. Is the Air Force presently engaged in contingency planning for an alternate location for Clark AFB in case we should find ourselves unwelcome guests in the Philippines or in a posture where we could not maintain our presence there?

General GABRIEL. Yes, sir. We have to do that. Clark is the best place, but not the only place. I would hope we do not have to leave. You cannot replace it in terms of a strategic location, as the Secretary has mentioned, but we obviously have to look at fallbacks.

STEALTH HEARING

Senator SASSER. My time has expired.

Mr. Chairman, I also have questions on the Stealth and B–1 bomber which I would like to submit for the record and make the entry under the 2-hour rule, Mr. Chairman.

Senator STEVENS. Thank you very much. We are going to have a Stealth hearing.

Senator SASSER. Yes. And I am looking forward to that. If at all possible, I would like to get some answers to these questions before the hearing so that I might be better educated to ask questions on the question of Stealth.

Senator STEVENS. Thank you very much.

Senator Johnston.

COST CONSIDERATIONS OF ATB

Senator JOHNSTON. Thank you, Mr. Chairman.

Secretary Rourke, I want to join the chorus welcoming you to the Committee.

Secretary ROURKE. Thank you, sir.

Senator JOHNSTON. I think your elevation to the Secretaryship is very well received on Capitol Hill as I think you are well aware. I am one of those who is very pleased about that.

Secretary ROURKE. Thank you.

Senator JOHNSTON. General Gabriel, we want to bid you sayonara. You have been a very strong Chief of the Air Force from my standpoint and from that of Capitol Hill. You will be missed as well.

General GABRIEL. Thank you, Senator.

Senator JOHNSTON. Both of you have our good wishes.

Now, I am concerned about the B–1 and ATB. I know we are going to have classified hearings. I think it is important at this point to get out as much information of a nonclassified nature as we can because, as you know, there is a blizzard of misinformation put out I think principally by those who want to see the B–1 program continue.

There have been some adverse cost considerations and bomb load considerations and length of mission capability and information about glitches.

What can you tell us of a nonclassified nature that would dispel some of that bad information about the ATB?

Secretary ROURKE. Simply, Senator, if I may, and that is why the classified hearing, Mr. Chairman, is extraordinarily welcome and a good idea. We are getting into a very difficult situation on, I would not say disinformation, but perhaps misinformation and erroneous activity.

What we are authorized to pursue in terms of the ATB in public discussion is obviously that the program is on schedule. We are moving ahead aggressively with it. We see no show stoppers. It takes great advantage of the low observable technology.

BOMBER STUDY

Then we are required almost to stop until we have a bomber study that will be coming to you that has been unfortunately delayed at the Pentagon by as much as 60 days. You will be getting that study. You will be getting a lot more information about this classified program.

Senator JOHNSTON. Is what is coming from the Pentagon classified?

Secretary ROURKE. Yes. What is perhaps important to point out, Senator, is the awareness of the Department of Defense. We are not all blind, dumb mules. Understanding the competition for dollars that will be upon us not only in the ATB–B–1 struggle, but certain other important programs where there is heavy competition. We understand the real flow of the competitive market and the requirement for that and observe them honestly.

DISCLOSURE OF ATB INFORMATION TO CONGRESS

It has been suggested in many quarters at the Pentagon that if we really plan to move out smartly on the ATB program, we had better start giving members of Congress who have responsibility for voting on it a little more substance with which to deal and combat, if you will, some of the disinformation, or I should keep saying misinformation, that has been conveyed.

We think it is an outstanding program. We do not think the costs will be out of line. We have some concerns. It is in the R&D area. We think the benefits are extraordinary for the national security interests of the public.

I have to stop there, General Gabriel, unless you have something you want to add.

General GABRIEL. You are hitting those points I am concerned about—points that have been put in the papers recently that are wrong. [Deleted.]

[Deleted.]

General GABRIEL. Absolutely.

Senator JOHNSTON. Is that correct?

General GABRIEL. Yes, sir.

Senator JOHNSTON. And that the information we will get in secret will show fully why the Congress should, and I hope will, proceed with ATB.

Secretary ROURKE. I think you will find great comfort in the substance of the information.

A-10 PROGRAM

Senator JOHNSTON. That is very good to hear.

A month ago you said something about the A-10 in a complimentary way. That program continues to be highly regarded in the Air Force?

General GABRIEL. It does. We are very pleased with the turnaround times and maintenance on the A-10. It is a very simple aircraft to maintain and operate.

Senator JOHNSTON. What are your plans for procurement on the A-10?

General GABRIEL. We finished that a few years ago.

Senator JOHNSTON. No plans for any further procurement?

General GABRIEL. Not A-10's, no.

CLARK AIR FORCE BASE SECURITY

Senator JOHNSTON. At Clark Air Force Base is the security there adequate? Have there been any incidents? Would you be prepared for any incident if you get an incident situation at Clark?

General GABRIEL. We have increased our security there. We share that responsibility with the Filipinos because it is their base. We cannot keep a fence around it. At the same time, security measures are designed to protect what we have there, but not in terms of the New Peoples Army. The NPA has not been a problem around Clark or Crow Valley where we fly Red Flag type training operations. I do not see that as a problem in the future. It was not a problem during the election recently.

Secretary ROURKE. That is the substance of our information, too, Senator. In a nutshell, as a result of not just the Filipinos elections, but the entire terrorist threat, if you will, has caused us great concern. There are a number of programs ongoing in the Department of Defense in the antiterrorist areas. We are working with the Army on air base support and defense and have a shared program with them that is very effective.

The bottom line is that we are going to do our level best to make the men and women who serve in and out of uniform as safe and secure in their responsibilities as we possibly can. You are aware, as painfully as we are, what the cost of those programs will be and the degree to which you can go and still not protect the security of your people 100 percent.

We are trying that every day. There is a greater sense of awareness and alertness on all our bases. We have gone to great length to indicate to people the kind of ABC's one must follow. All the way from concrete barriers and all the things that resulted from some of the tragedies, such as Beirut, to increase the sense of awareness, the booklets, pamphets, briefings, and symposia that indicate the ABC's of change. Such as a change of schedule, or of routes. We also tell them not to use the same door three times in a row, and these kinds of things to give the people who serve abroad a greater sense of awareness so they can protect themselves.

We will do our level best to devote the dollars necessary to provide physical security for them.

AIR FORCE/NAVY JOINT FIGHTER

Senator JOHNSTON. Mr. Secretary, there have been plans underway to develop a new fighter in the 1990's for both the Air Force and the Navy. Have the Navy and the Air Force considered the production of a joint fighter much as we did with the F-4 series?

Secretary ROURKE. Yes, sir. We have talked to the Navy about that. There will be more coming out on this in a matter of weeks. The question arises, and I will ask General Gabriel to speak to this, what are the functions that we anticipated from the ATF and what does the Navy want to get out of their ATA.

The initial indicators are that they have a rather different substantive use application of their aircraft than we do. There is, however, and that is what we hope to take advantage of, a commonality of systems in the aircraft. To the extent we can assist each other in economy of source in the securing of those systems, we will pursue it.

Secretary Lehman and I have met three or four times and we will be doing something substantive on the issue, I hope as early as next week. But we will not be initially procuring the same aircraft, that appears to be clear at this juncture.

General GABRIEL. The Navy is building an attack aircraft. It will be optimized for low altitude. Both theirs and ours will incorporate Stealth. We will get the maximum commonality between the two, but our aircraft is for air superiority and will have to be effective at higher altitudes. We have to get on top of the pack, look down and take care of the Fulcrums, Flankers and Foxhounds, and protect all our other resources that might be at a lower altitude.

We have high altitude requirements, theirs are low altitude. They are attack; we are air superiority. The joint engine that we thought we might be able to pull off is not possible,. They are flying in a different regime entirely.

There are other areas where we can get some commonality. This is what the Secretary has mentioned. We are going to do as much as we can.

Senator JOHNSTON. Thank you, General.

PHILIPPINES CONTINGENCY PLANNING STUDY

Senator STEVENS. Mr. Secretary and General, I think the record here should show that Senator Mattingly, who is chairman of the Military Construction Subcommittee, in his report in 1985 directed that the Department undertake a study to initiate a contingency planning effort which would analyze what military construction programming might be necessary to prepare alternate locations for missions in the Philippines and the study should be made available to Congress not later than March 1.

That was supported in the Congress. The conference confirmed the request for that report. As a matter of fact, there were three reports that were in that section concerning the Philippines.

Can we expect those reports to be submitted on time to the committee?

Secretary ROURKE. We will get on it as soon as we leave the hearing. I do not know where the report is. I know all the details concerning it have been beaten to death at the Pentagon and how it has been affected by the ongoing elections and results therefrom and whether the White House or Department of State has any further suggestions as to inclusion of other items in that kind of report. We will get on it as soon as we leave the hearing.

Senator STEVENS. One of the reports requested by the Committee was based on the assumption of continued access to the bases in the Philippines. I think the alternate study now becomes quite significant. That was dated in October and the conference agreed to it on November 19. I hope it is underway.

FORTY TACTICAL WING AIR FORCE

Secretary ROURKE. I am sure it is. The only question is, and that is why we want to be as responsible as possible, that it is not an obsolete report. This thing has been so fluid that we would anticipate making the report as current a presentation as possible. We will look into that.

Senator STEVENS. As you know, gentlemen, this has been glossed over. We are going to go into details throughout your portion of the Department in subsequent hearings.

I am concerned about a couple other issues. One is that we have a request now for an increase in production of tactical fighters, up to 294 in 1987 and up to 324 in each successive year through 1991.

Last year when I asked questions about what was necessary to sustain a 40 tactical wing Air Force, assuming an average life of the fighter of 10 to 11 years, we were told 260 or 280 was sufficient to support a 40 tactical fighter wing force.

Why are we going up to 294 in 1987 and then up to 324 in successive years if the 280 is sufficient to support a 40 tactical wing force?

Or does this mean to us that you are now seeking to expand the number of wings?

Secretary ROURKE. No, sir. What we would hope to grow to, and that is far short, as you know, of the Soviets, we hope to grow to 40 tactical fighter wings and at the same time replace and modernize the F–4's and 106's that support us.

Your numbers, Senator, are on target. I do not know what Gramm-Rudman will do to us in terms of our numbers. We remain ever optimistic.

Senator STEVENS. Let me correct you. It is not Gramm-Rudman that will do it to you; it is us. We are going to have to get some of this out of here. I do not understand that increase in view of the answers we got last year. 280 was the maximum we were told was necessary to sustain a 40 tactical wing fighter force.

Now we are asked to go to 294 in 1987 and 324 in each successive year through 1991. That is a substantial increase. I would like you to put something in the record here, subject to my 2-hour concept, to explain that.

It does seem to me that it is right off the wall to go up that far in a year. If you are going to face termination of programs due to these fiscal restraints, that perhaps we ought to look at the sudden surges in some of these programs and protect the ongoing programs in other areas.

Secretary ROURKE. I understand. The only difference that we have perhaps at issue is that we do not consider, and I guess that is a question of misunderstanding on our part, the 48 air defense F–15's to be part of the tactical force number which was referred to in testimony last year.

Why don't I ask General Gabriel to reply.

General GABRIEL. The 264 is what you need annually to grow to 40 wings by 1991 and to maintain the average age of the aircraft at 10 years. That is what we are trying to do. It takes 237 a year to maintain the current force at the same 10-year average age—just to hold our own. The higher figures you mentioned include the air defense fighters when they up to 60 a year; air defense fighters, which are not part of the 40 tactical fighter wings.

When we are talking about 40 wings, we are talking about tactical fighters that will deploy. The air defense fighter will stay in the United States.

Senator STEVENS. The increase we are projecting is 180 to 216 F–16's.

General GABRIEL. That is right. The 216 plus 48 F–15's will total 264 which is what you need if we are going to go to 40 wings. We have been chasing that goal for years.

Senator STEVENS. Are you 228 now?

General GABRIEL. No. 216 is right. The number of F–16's is 216 plus 48 F–15's..

Senator STEVENS. Your total production this year, according to my records is 228?

General GABRIEL. That is correct.

Senator STEVENS. If I am correct, then you are projecting to go to 294 in 1987 and 324 in 1988. That is a whale of a jump if we are facing restriction.

General GABRIEL. Again we are talking about the production of 60 additional air defense fighters per year which are not deployable. They stay in the states. They are purely for home guard.

Senator STEVENS. We will have to take a look at that.

STATUTORY REQUIREMENT TO AWARD AIR DEFENSE AIRCRAFT CONTRACT

General GABRIEL. We will check it out for you.

Senator STEVENS. Lastly—and I am trying to meet my commitment that these overviews are going to be just 2 hours long, if we can keep to this 10-minute concept. Did I hear you, Mr. Secretary, say that you now believe you may be able to comply with the statutory requirement to award that contract on this competition for air defense aircraft by July 2?

Secretary ROURKE. Senator, we will do whatever the Congress requires.

Senator STEVENS. That is the law now.

Secretary ROURKE. It is indeed the law. We felt it was our responsibility in responding to Senator Goldwater, and we will be glad to share that correspondence with you as a result of the meeting with General Skantze and certain follow-on meetings we had with Secretary Taft as to what problems might be inherent in providing for a disciplined, truly open competition within that time frame. It is, I think, a substantive argument. It is one with which the Congress might not agree.

If they do not, we will try our level best to achieve that July 1 date, as they say, in the sense of openness and fairness and there are arguments therein. When you see the time lines and bar charts that are provided in this rather extensive presentation that the staff might find useful analyzing, I think you will see some wisdom there.

Senator STEVENS. I do not see anything coming down the pike that will change that date, the $200 million that you can spend on the basis that you award the contract by July 1.

Secretary ROURKE. And that we might lose the $200 million if we do not. That is one of the considerations and perhaps one of the bases on which others in the Congress might consider giving the Department of Defense some relief on the issue. If they do not, we have another problem.

Senator STEVENS. I would like to have some timely notice of that.

Secretary ROURKE. Absolutely.

Senator STEVENS. If you are not going to make July 1, we ought to change that in the near time frame. I do not want to be faced with the problem of getting something through in the June area when the log jam is on the Floor and trying to get something through and saying you have to have more time.

REPORT ON AIR DEFENSE AIRCRAFT CONTRACT

Give us a report in the near term as to what your thinking is about that date. Right now we can change it with ease if you need another two months, whatever it is, but it will not be easy to change that in June.

Secretary ROURKE. Understood. We are working on the problem. I appreciate your helpful suggestion. We will be back with you on it.

Senator STEVENS. We thank you very much.

General, I hope it is not true that this is your last time before us. I think you will be back sometime.

When are you going to step down?

General GABRIEL. It will be the end of June.

Senator STEVENS. We expect to see you before then.

General GABRIEL. You will, sir, I promise you.

SUBMITTED QUESTIONS

Senator STEVENS. Thank you very much. We appreciate your help to this committee. We look forward to working with you. Again, I want you to report to me any questions submitted to you that take more than 2 hours to answer.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR D'AMATO

T-46 TO ENHANCE PILOT TRAINING

QUESTION: From your comments, it would appear that pilot training has been relegated to a lower priority in your budget request. With the increased sophistication and complexity of aircraft coming into the Air Force inventory, shouldn't there be stronger emphasis on making your pilot training program the safest and the best that it can be by providing it with enhanced modern equipment such as the T-46?

ANSWER: To meet the requirement for a suitable training aircraft and overcome the deficiencies of the T-37, the Air Force originally planned to procure the T-46. Primarily due to budgetary constraints which caused reductions in several Air Force programs, it was necessary to cancel the FY 87 request for the T-46. Alternatives to address training aircraft deficiencies are currently under review to ensure we continue to provide the highest quality pilots in the world.

MONEY REQUIRED FOR T-46 PRODUCTION

QUESTION: How much money would be required in FY 87 to keep the T-46 program going at least at a minimal production level?

ANSWER: It is difficult to be certain how many aircraft would be necessary for a minimum production level in FY 87 due to production delays that have been seen in the T-46 program. One study conducted by the T-46 System Program Office (SPO) has estimated that only four months of FY 87 production would be necessary, given the known delays. This assumed a full Milestone III production decision could then be made for an FY 88 buy with no interruption to the production line. The SPO calculated that 12 aircraft would be produced at a three per month rate. The preliminary estimate for such an option would be about $90 million for the weapon system plus $8 million for initial spares. This estimate does not include advance buy funding for FY 88 quantities.

USING T-46 FOR FORWARD AIR CONTROL MISSION

QUESTION: I understand the Air Force is seeking a new aircraft to perform the Forward Air Control mission. The Air Force has O-2s, OV-10s and OA-37s for this mission. I understand the Tactical Air Command has asked the Air Training Command if it has spare T-37s which can be converted to OA-37s and used to replace O-2s. Why not fill this requirement with T-46s?

ANSWER: We are retiring the O-2 because it is nonsupportable and has significant safety problems. Air Training Command is transferring T-37s to Tactical Air Command to meet our requirement to replace the O-2s not later than 4th quarter FY 86. These T-37s will be minimally modified with an additional radio and navigation equipment. These aircraft are intended for interim use as a flying platform and not as a replacement FAC aircraft. Even with FY 87 funding, the T-46 would not be available to meet the near term O-2 replacement requirement.

COST TO CONVERT T-37 TO OA-37

QUESTION: How much does it cost to convert a T-37 to an OA-37?

ANSWER: Cost per aircraft will vary according to the total number of aircraft that are converted. The approximate cost for basic aircraft conversion is $1.926 million per aircraft ($1.625 million for aircraft equipment, modifications, and $.251 million for spares support). Cost analysis of basic aircraft conversion follows:

a.	New Wing	$ 280,000.00
b.	Fuselage Rework/ Replacement	663,000.00
c.	Replace Empennage	15,000.00
d.	Replace Main Landing Gear/Modify Nose Gear	37,000.00
e.	New Engines (J85-17A)	680,000.00
	Total Basic Aircraft	1,675,000.00
f.	Spares	251,000.00
	Overall Total Per Aircraft	1,926,000.00

NUMBER FAC AIRCRAFT NEEDED

QUESTION: How many of these Forward Air Controller aircraft does the Air Force need?

ANSWER: The requirement is for 280 FAC aircraft. This number is based on the number of U.S. Army manuever units being supported and additional aircraft to support training and provide replacement aircraft. The present requirement is computed as follows:

U.S. Army Divisions = 25 X 5 aircraft per division = 125
U.S. Corps = 5 X 5 aircraft per corps = 25
Theater specific requirements for PACAF, USAFSO and AAC = 41
Attrition and reserve aircraft = 22
Training aircraft = 41
Backup aircraft inventory = 23
Test aircraft = 3

T-46 SURVIVABILITY AS FAC AIRCRAFT

QUESTION: Wouldn't a T-46 be more survivable than even an OA-37 as a FAC aircraft? Doesn't the T-46's newer engines, lower noise signature, greater payload, availability of space in its avionics bays for radios and identification-friend-or-foe gear, and underwing hardpoints make it a superior candidate for this follow on FAC aircraft?

ANSWER: Preliminary data seems to indicate little difference in the survivability of either the OA-37 or the T-46. Both aircraft have potential advantages and disadvantages. However, in order to make a valid decision on this issue,a T-46 aircraft, modified to perform the FAC mission, would have to be fully tested to determine actual survivability/capability.

SOF MISSIONS FOR 23rd AIR FORCE

QUESTION: The 23rd Air Force at Scott Air Force Base is responsible for Special Operations and the Rescue and Recovery Service. The Air Force is not funding the HH-60 Black Hawk Helicopter in FY 87. This Helicopter's primary purpose is for search and rescue. What aircraft does the Air Force plan to use for such missions for the 23rd Air Force?

ANSWER: The Air Force currently has the following aircraft assigned to rescue:

32 H-1s
50 H-3s
9 UH-60s
13 H-53s

The H-53s will be the source for the Congressionally directed build of Pave Low III Special Operations helicopters.

The Air Force also has the following Special Operations helicopters with a collateral mission of combat rescue and may be tasked by the operational commander as desired:

7 HH-53H Pave Low IIIs
4 UH-1s
6 H-3s

QUESTIONS SUBMITTED BY SENATOR STENNIS

CURRENT SITUATION OF T-46A

QUESTION: Mr. Secretary, it is my understanding that the Air Force cancelled its T-46A trainer aircraft program. As I am sure you are aware, Columbus Air Force Base in my state is one of the fine pilot training bases in the country. However, their current trainer aircraft, the T-37 and T-38, will need to be replaced somewhere down the road. What is the current situation with regard to the T-46A trainer aircraft?

ANSWER: Columbus Air Force Base is well known and respected within the Air Force as a training base. We had intended to replace the T-37s there with the T-46. Budget austerity, however, has forced us to trim troubled programs rather than stretching out healthy ones. As a result, we may have to defer replacement of those T-37s at Columbus and our other fine training locations. We will determine our final strategy after a review of the program.

REPLACEMENT OF CURRENT TRAINER AIRCRAFT

QUESTION: What are your plans for replacement of the current trainer aircraft?

ANSWER: Because of budgetary constraints, we have had to delete T-46 funding from the FY 87 budget. Alternatives to address current deficiencies are under review.

PILOT STUDENT TRAINING LOADS

QUESTION: What are the projected pilot student training loads and how will the cancellation of this program affect them?

ANSWER: Our student pilot training load averages approximately 2150 and is currently programmed to remain constant for the foreseeable future. Budgetary growth has been sharply curtailed requiring us to delete the T-46 funding from the FY 87 Budget. Alternatives for the T-37 replacement are currently under review. In the interim we will continue to meet programmed pilot requirements using available Air Force T-37 assets.

IMPACT OF SHUTTLE ACCIDENT

QUESTION: The recent accidental destruction of the Challenger Space Shuttle took place after the preparation and submission of the 1987 budget. The Air Force budget includes large amounts of funds for space activities involving both the Space Shuttle and other launchers. What can you tell us about the impact of this accident on your 87 budget?

ANSWER: The Air Force was tasked by OSD to make a detailed and careful review of the impact to DoD space programs and to provide a set of alternatives to recover shortfalls in launch capability. NASA is undertaking a similar effort for the civil launch requirements. DoD and NASA are coordinating these efforts to produce a set of national priorities. The recovery plan will be based on satisfying these priorities. Once these priorities are established and the recovery plan developed we can provide the impact to the FY 87 budget.

DELAY OF SHUTTLE LAUNCHES

QUESTION: Can we expect some savings because of delays in Shuttle launches? Can we expect requests for additional funds to provide more, non-Shuttle-based launch capability?

ANSWER: DoD is assessing the effect of the recent Challenger accident and the many proposals to lessen its impact on the national space program. Even though some launches will be delayed due to the grounding of the shuttle fleet until the problem is resolved, certain satellites must be launched to meet mission requirements. To manage this problem, DoD and NASA are developing a set of national launch priorities. Those satellites that must be delayed must be stored, and we will incur the costs of storing the satellites, and the associated upper stage launch vehicles. We would also have to retain contractor personnel to store and launch the satellites. In many cases if the delay is the currently projected twelve months, these costs would exceed funds programmed for launch in FY 86 and 87. In addition, you should expect requests for funds to procure additional Complementary Expendable Launch Vehicles (CELVs) as well as a limited quantity of medium size launch vehicles; e.g., Atlas, Titan II, Thor/Delta. These launch capabilities are being jointly pursued with NASA to determine the best approach to maintain assured access to space through the 1990s.

CELV LAUNCHERS

QUESTION: Do we need to speed up the production of the new CELV launchers?

ANSWER: Yes. The current CELV production rate supports an Initial Launch Capability (ILC) in October 1988, a second launch vehicle within 90 days and sustains an annual launch rate of two vehicles through FY 93. Although it is impossible to accelerate the ILC without undue risk, a requirement to both speed up and increase production of CELVs is necessary to provide a sufficient lift capability to reduce the backlog created by the loss of Challenger. Preliminary analysis indicates it is prudent to supplement the STS capability by increasing the production rate to four or five CELVs per year by FY 89.

INCREASED BUILDUP OF ENLISTED PERSONNEL

QUESTION: According to the DoD 1987 Manpower Requirements Report, the Air Force has a surplus of E5-E7 personnel, and this surplus is expected to grow from 6,800 in 1985 to 14,000 in 1987. This surplus is offset by shortages of personnel in the lower E1-E4 grades. What is the reason for this increasing buildup of higher graded enlisted personnel? What is the annual cost of maintaining this higher-than-programmed grade structure?

ANSWER: The Air Force does not have a surplus of E5-E7 personnel. In fact, the Air Force FY 85 requirement in these grades, as determined by our manpower standards, is more than 15,000 higher than our inventory. Programmed Manning and Individuals (PMI) accounts for fiscal limitations and is less than our requirement. The reported Air Force enlisted PMI data was understated in both the 1986 and 1987 DoD Manpower Requirements Reports due to the fact that manpower grade programming factors are updated every three years while inventory is updated after each budget cycle (3 times a year). The last grades allocation was made in mid 1983 for FY 84 - 86. New grade factors for FY 87 - 89 will be distributed in July 1986. The updated PMI figures below indicate what would have been distributed had there been an annual grade allocation in FY 85 and FY 86. The updated PMI values show there is no surplus of E5-E7 personnel. We have instituted mechanisms to ensure that future reports use the correct factors and to improve the linkage of grade requirements, funding levels and inventory.

UPDATED ENTRIES

	FY 85	FY 86	FY 87
E1-E4			
Updated PMI	268.8	265.3	258.6
Inventory	267.9	265.3	258.6
E5-E7			
Updated PMI	206.0	213.4	220.0
Inventory	206.0	213.4	220.0
E1-E9			
Updated PMI	489.5	493.5	493.3
Inventory	488.6	493.5	493.3

LARGE INCREASE IN O&M PROGRAM 3

QUESTION: In FY 87, the Operation and Maintenance, Air Force, appropriation increases by 5.1 percent or $1.0 billion over 1986 level. The Program 3 portion of this appropriation, which includes Intelligence and Communications, increases by $527 million, or 22.5 percent over the 1986 level. The balance of this appropriation increases by only 2.9 percent. What is the reason for this large increase in Program 3?

ANSWER: The increase of 22.5 percent is mainly attributable to the space program, which increases $355.5 million. Much of this increase supports programmed operations at Vandenberg and Cape Canaveral. At the time of budget submission, growth in the space shuttle program was based on shuttle orbiter flight charges and the shuttle processing contract to be paid to NASA in FY 87 to launch an increased number of Air Force payloads in FY 88. Depending on the delay to the shuttle program, these funds may still be required for FY 88 launches or alternatively for storing satellites and the associated upper stage launch vehicles and retaining contractor launch teams until these payloads can be handled. Other space program increases include those in the Space Booster program, caused by a 1 1/2 year extension of TITAN 34D launch services at Cape Canaveral, and the Consolidated Space Operations Center (CSOC), which is building toward a 1992 fully operational capability. The CSOC will provide a secure facility from which flight planning and control of DoD shuttle missions will occur. Current plans for the facility include data systems modernization, the advanced remote tracking station, and communication upgrades.

MANNING OF SUPPORT ACTIVITIES

QUESTION: The DoD Manpower Requirements Report provides details and analysis of the manpower requirement shown in the FY 87 budget. According to the 1987 report, the Air Force plans to man its support activities at 97 percent of active duty programmed manpower requirements. This is a much higher level of manning than either the Army or the Navy plans. For example, in 1987, the Navy plans to man only 88 percent of its support spaces. If the Air Force manned at the Navy's level for support activities, it would save 25,400 active duty personnel. If the Air Force manned at the Army's level for support activities, active strength could be reduced by 42,300 personnel. Why does the Air Force propose, in 1987, to man its support activities at nearly 100 percent of requirements? Why does the Air Force need to man its support activities at a much higher level than either the Navy or the Army?

ANSWER: The Air Force cannot reduce its support force to the levels indicated in the DMRR by the Army and Navy without also reducing its combat units, R&D efforts and procurement programs. Support manpower needs are driven by programs approved and funded by the Congress. The nature of Air Force weapon systems will not allow us to create a "hollow" force. If support forces are reduced, programs will have to be cut back.

Manpower comparisons between Services can be very misleading. Manpower accounting in support activities between Services differs. This clouds results. For instance, almost 45 percent of the Air Force manpower is in the support activities account of the DMRR--as compared to approximately 22 percent of the Army and 26 percent of the Navy. The major factor in the percentage differences is the way the Services account for support activity personnel. All of the Services include in support activities fixed-site services such as housing and real property maintenance. However, in the Army, Navy, and Marine Corps, manpower providing food, transportation, and supply services to divisions and ships, which are integral for operational purposes, are counted as mission manpower. The differences among the Services in accounting for support manpower makes the overall Air Force percentage appear to be higher than the other Services, but support functions are just as critical to an Air Force combat wing as they are to an Army division of a Navy ship.

Support forces include functions necessary for sustaining combat operations. This is because we operate from fixed bases—they are our fighting platforms.

QUESTIONS SUBMITTED BY SENATOR PROXMIRE

MISSION REQUIREMENTS FOR ASAT MISSILES

QUESTION: As a result of changes in the program over the last three years, can you give us some idea of how the mission requirements have or will change for the ASAT missiles? For example, can you give us an idea how many Soviet satellites originally were expected to be targeted by these ASAT systems, and can you give us how many Soviet satellites you now expect to target with this ASAT system? Can you compare these figures with the JCS requirement or expected requirement for Soviet satellites that need to be targeted?

ANSWER: The target lists are categorized by importance. A priority 1 target would represent a real-time threat, a priority 2 a near-real-time threat, a priority 3 a direct military support threat, and a priority 4 an indirect military support threat. We are primarily concerned with priority 1 and 2 threats. The FY 85 and FY 86 force structures were based upon the 1981 Mission Element Need Statement (MENS). [Deleted] [deleted]. The restructured ASAT program contained in the FY 87 President's Budget is based upon a two-phased approach resulting from a 1985 reassessment of requirements by Air Force Space Command. [Deleted] [deleted]. A decision on the force structure for the second phase will be made in the FY 90/91 time period. At that point, in addition to reassessing the capabilities of the ASAT missile, we plan to evaluate the maturity of other technologies that could be used to provide an ASAT capability. [Deleted].

LIMITATIONS OF THE ASAT SYSTEM

QUESTION: We hear all this talk in the press about the superior capabilities of our ASAT system, particularly as compared to the Soviet ASAT system. Can you describe for us some of the limitations of the ASAT system we are planning to deploy — particularly against maneuvering satellites?

ANSWER: While our ASAT system may utilize more advanced technology and a different sensor technique than the Soviets (we use an infrared sensor, the Soviets use a radar), we do not consider it to be superior given the current state of development. We are still in the initial testing phases while the Soviets have achieved a (d) with their operational system. Further, their operational system has been demonstrated at altitudes twice the capability of our ASAT. Some of the major constraints of the ASAT system are described below. We do not consider these as limitations since we have structured our operations concept and system design to accommodate them.

1. Our ASAT is designed to intercept satellites in low earth orbit. [Deleted].

2. Constraints on destroying satellites which have maneuvered are scenario dependent:

   a. (Deleted.)

   b. (Deleted.)

   c. (Deleted.)

3. The (deleted.)

QUESTIONS SUBMITTED BY SENATOR JOHNSTON

T-46 FLIGHT TEST PROGRAM

QUESTION: I understand that the T-46 flight test program is progressing extremely well. Would you care to comment on that test program?

ANSWER: We are pleased with the flight test effort that is taking place at Edwards AFB, CA. After some unfortunate delays caused by faulty flutter test instrumentation, the program has now completed over 55 flights while amassing over 80 flight test hours. These tests have shown that the aircraft is maintainable and appears at this stage to be reliable. Flight test has pointed out the need for an artificial stall warning. The basic aircraft has none, and a very positive stall warning is particularly necessary with new student pilots. Flight test has also shown that aircraft drag is higher than expected. Since the aircraft weight has grown from that originally proposed, the combination of higher than predicted weight and drag means that a number of performance-related specifications are not likely to be met without extensive contractor effort.

CANCELLATION OF T-46 PROGRAM

QUESTION: As you know, there is no money requested for the T-46 in the FY 87 budget. For at least five years, a parade of Air Force witnesses has testified regarding the pressing need for a new Air Force trainer. Suggestions that the Air Force use the Navy's T-34C turbo prop aircraft were vigorously refuted by arguments stressing the need for a new trainer specifically designed to meet Air Force training requirements. Now you are calling for an end to the program. Why the sudden about-face?

ANSWER: The decision to defer replacement of the T-37 was forced by significant reductions in planned growth in the Air Force budget. We decided it was more prudent to maintain healthy programs and trim troubled ones.

PILOT TRAINING WITHOUT T-46

QUESTION: Without the T-46, how do you propose to meet pilot training needs for the future?

ANSWER: Air Force pilot requirements will remain near current levels for the foreseeable future. Budgetary growth has been sharply curtailed, requiring us to delete T-46 funding from the FY 87 Budget. Alternatives for the T-37 replacement are currently under review. In the interim we will continue to meet programmed pilot needs using available Air Force resources.

T-46 PROGRAM

QUESTION: If you intend to "make do" with the present T-37 trainer, why did you initiate the T-46 program in the first place? If your arguments of yesteryear were valid regarding the requirements for a new trainer, why abandon the program in mid-stream after already spending over $600 million on a program you now intend to kill?

ANSWER: The Air Force validated a Mission Element Need Statement in June 1979 to replace the 30-year-old T-37B. The need for a new trainer remains valid, but budgetary constraints have caused reductions in several Air Force programs including FY 87 funding for the T-46. We are currently reviewing alternatives to address training aircraft deficiencies.

T-37 REPLACEMENT

QUESTION: Do you intend to come back to the Congress at some time in the future to ask for a replacement of the T-37 or for funds to upgrade a 30-year old airplane as the Air Force's primary trainer?

ANSWER: We are well aware of the Air Force's need for a replacement trainer. The budgetary growth necessary to meet many important requirements has been sharply curtailed and funding for the T-46 was deleted for FY 87. Alternatives to address training aircraft deficiencies are currently under review.

AIR FORCE/NAVY JOINT FIGHTER

QUESTION: Both the Air Force and Navy have plans underway to develop a new fighter aircraft in the 1990s. Estimates for the costs of the new fighters run well over $40 billion. Has the Navy and the Air Force considered the production of a joint fighter, as we did with the F-4 series, in order to save as much money as possible when we have so many new and expensive programs ready to come off the drawing board that will compete for very scarce funds. I would appreciate a detailed response to this question be submitted that covers any proposed plans along this line and the mechanism being used to evaluate this proposal.

ANSWER: In 1984, an Air Force/Navy working group was formed to examine the feasibility of a joint ATF/ATA program. It was quickly apparent to the Services that, because of significant differences in the primary missions of the ATF and ATA, a joint ATF/ATA program leading to a single design would not be cost effective nor would it meet the operational needs of the two Services.

The Advanced Tactical Fighter (ATF) will be the Air Force's next generation air superiority fighter, designed to enter the inventory in the mid-1990s as a follow-on to the F-15. The Advanced Tactical Aircraft (ATA), on the other hand, is the Navy's follow-on to the A-6, a carrier-based, air-to-surface attack system. The ATF/ATA mission differences result in the need for significantly different aerodynamic designs, engines, sensors and weapons. For this reason, the Air Force and Navy decided not to embark on a joint development for a single design.

Although the ATF and ATA missions call for different aircraft, the Air Force and the Navy have been working closely for more than a year to ensure that concurrent development of ATF and ATA avoids duplication of effort and capitalizes on opportunities for commonality and cooperative development of critical technologies, subsystems and components, particularly in the area of electronics. A joint ATF/ATA Commonality Working Group is managing that effort and responding to direction by the Senate Armed Services Committee to examine the feasibility of a goal of 90 percent commonality of electronics between the ATF and ATA.

As a related matter, the Air Force and Navy are taking steps to evaluate opportunities for cross-service utilization of the ATF and ATA; i.e., use of an ATA-variant for future Air Force air-to-surface mission needs and use of an ATF-variant for future Navy air superiorty needs. In the near future, we expect to sign a memorandum of understanding with the Navy to formalize these efforts. Our intent is to identify, at the earliest possible point in the development process, design and system changes needed to minimize the subsequent cost of developing variants to satisfy the other Services' mission requirements.

COMPETITION IN ATF PROGRAM

QUESTION: Regarding the Air Force plans to develop the next generation fighter aircraft, do you have any plans to insure competition throughout both the RDT&E and procurement processes?

ANSWER: Yes, steps have been and will continue to be taken to ensure competition in all phases of the Advanced Tactical Fighter (ATF) program at the prime and subcontractor levels.

QUESTIONS SUBMITTED BY SENATOR BYRD

INCREASED DOD PRESENCE IN WEST VIRGINIA

QUESTION: Mr. Secretary, General Gabriel, I want all of you to be aware, if you are not so already, that West Virginia has a record of participation and sacrifice in World War II, Korea, and Viet Nam that may well be unmatched by any other state. Now we in West Virginia find ourselves burdened with extraordinarily high unemployment. This is a priority concern with me, and I expect to continue working closely with key Defense Department officials to see what can be done to increase the Defense Department's presence in the State of West Virginia with a view to helping to alleviate the unemployment problem. I would like to be assured that I will have the full cooperation of the Department of the Air Force in this endeavor. Mr. Secretary, do you or any of your colleagues have any suggestions or recommendations for increasing the

Department's presence in West Virginia that you would like to submit for the record? I would like to see some thoughtful recommendations formulated for the record.

ANSWER: Senator Byrd, let me assure you that the Department of the Air Force recognizes the outstanding contributions made by the fine people of West Virginia on behalf of national defense. We are extremely pleased with the performance of the units in your state.

Several actions have already been taken which will increase the Air Force presence in West Virginia and improve the quality of your existing units. The 130th Tactical Airlift Squadron at Charleston will be modernized with eight C-130H model aircraft beginning this year. The addition of this improved aircraft system will help ensure the viability of this unit in the future. Air Force presence will be increased at Martinsburg later this year as we begin to add four more C-130B aircraft to the 167th Tactical Airlift Squadron. We have already identified a short field runway construction project at Martinsburg for accelerated design and construction, and it was submitted in the President's Budget. We are also completing a comprehensive base use plan at both Martinsburg and Charleston which has identified other necessary projects in these areas. You certainly have our full support in getting additional projects completed as soon as possible, and we will carefully consider West Virginia in any future basing decisions.

LAND USE MASTER DEVELOPMENT PLAN, WEST VIRGINIA

Senator Byrd. Mr. Secretary, General Gabriel, on February 24, 1984, in my office, I discussed the matter of a "Land Use Master Development Plan" for the Air National Guard Base Facilities at Charleston and Martinsburg, West Virginia, with Brigadier General Wess Chambers.

Subsequently, on March 23, 1984, at a joint Appropriations/ Armed Services Committee hearing, I questioned General Chambers about this matter, and he indicated his support for the formulation of such a plan. I also discussed the possibility of additional C-130 aircraft at each of the West Virginia sites and the prospects of more modern aircraft such as the C-130H, for the West Virginia bases.

Senate Report 98-500, accompanying the Omnibus Defense Authorization Act, 1985, dated May 31, 1984, included language, incorporated at my request, indicating that the Armed Services Committee strongly supports the "Land Use Master Development Plan" for the Air National Guard Bases at Charleston and Martinsburg, West Virginia, as "...the best way to accelerate the full utilization, development, and expansion of these bases, including the receipt of additional aircraft, should they become available."

Senate Report 98-567, accompanying the Military Construction Appropriation Bill, 1985, dated July 26, 1984, also included language, at my request, endorsing the "Land Use Master Development Plan" for the Air National Guard Bases at Charleston and Martinsburg, West Virginia.

Subsequently, I was notified by the Air Force and the Air National Guard that (1) the 130th Tactical Airlift Group at Charleston is scheduled to convert their C-130E models to the newer C-130H models this year, with the first two C-130H models already having been stationed at Charleston; (2) the

167th Tactical Airlift Group at Martinsburg will be expanded from 8 to 12 C-130B aircraft later this year, with the associated increase of 29 full-time positions and 68 military drill authorizations and several millions of dollars in new construction; and (3) both the Charleston and Martinsburg locations are undergoing a "Comprehensive Land Use and Development Master Plan" which was placed under contract in September 1984, with an extensive review conducted last Fall, and a completion date scheduled for July or August of 1986.

I ask that the latest communication in this regard from General Conaway be published in the record at this point.

(The information follows:)

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
NATIONAL GUARD BUREAU
WASHINGTON, D.C. 20310

30 JAN 1986

Office of Policy and Liaison

Honorable Robert C. Byrd
United States Senate
Washington, D. C. 20510

Dear Senator Byrd

This replies to your recent inquiry concerning the "Land Use Master Plan" for West Virginia Air National Guard facilities.

Our plans for Charleston and Martinsburg remain as scheduled. The 130th Tactical Airlift Group will be converting its C-130Es to the newer C-130Hs beginning in July of 1986. The 167th Tactical Airlift Group at Martinsburg will begin its C-130B buildup from 8 to 12 aircraft beginning in October 1986. These actions will not incur any manpower changes for Charleston, but Martinsburg will add 29 full-time personnel and 68 drill personnel.

The Base Comprehensive Land Development and Master Planning contract is ongoing for Charleston and Martinsburg. The Air National Guard Directorate staff has completed an extensive review and critique of the architect-engineer firm's progress at each base in October and December, respectively. Based upon their guidance, the base comprehensive planning is expected to be completed by late February. At that time, the long range development alternatives will have been well defined and facilities requirements more precisely identified. The remaining work on the contract involves the completion of record drawings and should be completed in July or August.

Thank you for your support of the National Guard.

Sincerely

John B. Conaway

JOHN B. CONAWAY
Major General, USAF
Director, Air National Guard

CONVERSION OF C-130E TO C-130H MODELS

QUESTION: Mr. Secretary, would you please give me an updated schedule including significant milestone events, leading to full realization of the following: the conversion of C-130E aircraft at Charleston to the new C-130H models.

ANSWER: Our current program calls for the conversion of the C-130Es at Charleston, WV to C-130H beginning in the fourth quarter, FY 86. The conversion will be completed by the end of the first quarter, FY 87. We anticipate no problems in achieving that objective.

EXPANSION OF C-130B AIRCRAFT

QUESTION: Mr. Secretary, would you please give me an updated schedule, including significant milestone events, leading to full realization of the following: the expansion of the C-130B aircraft at Martinsburg from eight to twelve.

ANSWER: Our current program calls for expanding the Primary Aircraft Authorization of C-130B aircraft at Martinsburg, WV from eight to twelve during the first quarter, FY 87. We anticipate no problems in achieving that objective.

LAND USE MASTER DEVELOPMENT PLAN

QUESTION: Mr. Secretary, would you please give me an updated schedule, including significant milestone events, leading to full realization of the following: The land use Master Development Plan for the Charleston and Martinsburg Air National Guard Bases.

ANSWER: The Base Comprehensive Land Development and Master Planning contract is on-going for Charleston and Martinsburg. The Air National Guard Engineering Staff completed an extensive review and critique of the architectural-engineering firm's progress at each base in October and December 1985, respectively. The base comprehensive plan, which incorporates their comments, will be complete in March 1986. Long range development alternatives have been defined and facility requirements identified. The remaining work on the contract involves the completion of record drawings and is expected to be concluded in August 1986.

QUESTION: Mr. Secretary, on June 20, 1985, during Senate consideration of the FY 85 Supplemental Appropriations Bill, I engaged in a colloquy with the Chairman of the Defense Appropriations Subcommittee, Mr. Stevens; the Ranking Minority Member of the Subcommittee, Mr. Stennis; the Ranking Minority Member of the Senate Armed Services Committee, Mr. Nunn; and the Ranking Minority Member of the Military Construction Appropriations Subcommittee, Mr. Sasser, in which I secured their support for accelerated design and budgeting for military construction prospects in West Virginia. In addition, Senate Report 99-168, dated October 31, 1985, accompanying the Fiscal Year 1986 Military Construction Appropriations Bill included the following passage at my request:

DOD Facilities in West Virginia

"The Committee understands the need to accelerate

> the military construction program contemplated for West Virginia which has been raised in hearings before the Senate Committees on Armed Services and Appropriations. The matter has been the subject of discussion on the Senate Floor during the processing of the fiscal year 1985 supplemental appropriations bill. This need to accelerate the program has been the subject of correspondence with high-level military officials as well as discussions with the Secretaries of the Army and Air Force. The thrust of these discussions has been that early construction of these various projects will help provide much needed jobs; avoid the costs of inflation associated with delayed construction; and provide modern, updated facilities for use by military personnel in West Virginia. The Committee supports these arguments and directs the Department of Defense to redouble its efforts to accelerate the design of the various projects and to incorporate them into the fiscal year 1987 President's budget so that they may receive early consideration by the appropriate committees of Congress."

Mr. Secretary, please update for the record the information provided last year regarding which construction projects are contemplated in the latest Air Force and Air National Guard five year plans for West Virginia. Please indicate the project description, the location, the estimated cost and the Fiscal Year in which the project is contemplated. Which, if any, of these projects could be accelerated in Fiscal Year 1987?

ANSWER: The Air National Guard has revised its five year program for West Virginia based on the Base Comprehensive Land Development and Master Planning studies. An aggressive schedule of military construction projects for the two ANG bases has been developed.

Base/Location	Project Description	Contemplated FY	Estimated Cost ($000)
Yeager Airport	Vehicle Maint/Refuel Veh Shop	88	1,130
	Multiple Facility Additions	88	625
	Squadron Operations Addition	89	870
	Aircraft Holding Pad	89	1,000
	Parking Ramp Extension	89	1,300
	Add to POL Storage	89	1,700
Martinsburg	Short Field Runway	87	2,500
	Phase I Ramp Addition	88	1,900
	Composite Avionics NDI	89	700
	Add/Alter Oper Tng Complex	89	3,000
	Alter Hangar 110	90	500
	Add/Alter Jet Fuel Storage	90	2,370

The Short Field Runway project was accelerated into FY 87 in response to your request as quoted in Senate Report 99-168. This was the only project that met the 35% design requirement for the FY 87 congressional submission.

ACCELERATE CONSTRUCTION OF W.V. ANG FACILITIES

QUESTION: What more can be done to accelerate the construction of West Virginia Air National Guard facilities in response to language included, at my request, in the report accompanying the Fiscal Year 1986 Military Appropriations Bill and the urgings of my colleagues?

ANSWER: Based upon your request in Senate Report 99-168, the Short Field Runway project at Martinsburg was accelerated to FY 87. This was the only project that met the 35 percent design requirement for the FY 87 congressional submission. The military construction program, as previously detailed, reflects the Air Guard's efforts to accelerate the construction of West Virginia facilities.

KEEP FULLY INFORMED

QUESTION: Mr. Secretary, I trust that you and your colleagues will keep me personally informed on all matters relating to the Air Force and the Air National Guard in West Virginia. May I have your assurance on that?

ANSWER: Thank you for your support of the Air Force and Air National Guard and please be assured we will advise you when any changes are finalized which will affect West Virginia.

ADVANCED TECHNOLOGY BOMBER AND B-1B BOMBER ISSUES

QUESTION: News reports persist that the B-1B contractor, Rockwell International is seeking to produce more than 100 B-1B bombers, and that consideration is being given to delaying the initial operational capability (IOC) of the Advanced Technology Bomber (ATB), also known as the Stealth Bomber. Last year, Secretary Weinberger responded to the Senate Armed Services Committee that he would "strenuously" oppose diverting Stealth Bomber funds to other programs including B-1B production beyond 100 aircraft. Do you share this position?

ANSWER: We are committed to maintaining the current ATB schedule that achieves initial operational capability in the early 1990's. The ATB will provide a significant improvement in our ability to deal with advanced air defenses and help redress the strategic imbalance. The technologies associated with the ATB are well in hand, and it would be imprudent in terms of cost and military effectiveness to delay production of the ATB in favor of additional B-1Bs.

ATB PROGRAM SCHEDULE

QUESTION: Last year, your predecessor as Secretary of the Air Force, Verne Orr, testified that the Stealth Bomber program was on schedule and that there had not been any slippage. Would you agree that this is still the case this year?

ANSWER: Our previous testimony regarding the Advanced Technology Bomber schedule still applies. The development program is progressing well and the schedule has not slipped. Although the program is not completely free of schedule risk, the technology is well understood. We are committed to maintaining the planned schedule that achieves an initial operational capability in the early 1990's.

PROCUREMENT OF 100 B-1B BOMBERS

QUESTION: Last year, Assistant Air Force Secretary Thomas Cooper, who still holds his position, testified he also would "oppose very vigorously" any additional procurement of B-1B bombers beyond 100 aircraft. Do you agree with this position of your Assistant Secretary responsible for the research, development and acquisition of both the B-1B and the Advanced Technology Bomber?

ANSWER: Yes. We are confident that the President's two-bomber program consisting of 100 B-1Bs followed by deployment of the ATB in the early 1990s is the most effective and efficient use of our resources to modernize our strategic bomber force.

ASSESSMENT OF THE ATB PROGRAM

QUESTION: Last year, Secretary Weinberger responded to the Senate Armed Services Committee that "the Stealth Bomber is not (his emphasis) a paper bomber. The present program to develop the Advanced Technology Bomber has given us high confidence the system will achieve initial operational capability in the early 1990's as scheduled and be procured within projected cost." Do you agree with this position and assessment of the program?

ANSWER: Yes. Our confidence level is the same as last year. The ATB program is progressing at the most prudent pace. The program is fully funded, within cost, and on schedule for an early 1990's IOC.

ADVERSE AFFECTS ON NATIONAL GUARDS

QUESTION: Do you see any adverse affects on the Air and Army National Guard and Reserve units in West Virginia because of the Armed Forces Committee's proposed elimination of the service's Secretaries for Manpower and Reserve Affairs?

ANSWER: Yes, it would have significant negative impact if adopted, in that a strong proponent of the National Guard within the civilian leadership of the military would be eliminated. The Assistant Secretaries for Manpower and Reserve Affairs provide Secretariat-level guidance and perspective to the NG; establish policy in conformance with DOD/Secretary of the Air Force/Secretary of the Army-level inquiries about the National Guard; and provide necessary civilian/military interface at the service level. Elimination of these offices would result in the loss of Reserve Forces advocates at the Secretariat level; degradation of total force integration; dilution of the total force policy; and loss of Secretariat-level Reserve Forces expertise and military/civilian interface.

BASING SPECIAL OPERATIONS IN WEST VIRGINIA

QUESTION: Would the Air Force consider active duty basing in West Virginia in the area of Air Force Special Operations Forces training? West Virginia has natural terrain that could provide diverse opportunities currently not available at Eglin Air Force Base in Florida for AFSOF training especially in low level navigation and development of terrain following techniques. Training missions such as extensive low-level flight training at night in mountainous terrain (Pave Lows, Combat Talons), high altitude, low and high opening paradrops and other related scenarios could be conducted. I would appreciate thoughtful commentary from the Air Force on how these missions might be performed on a training basis in West Virginia with active duty basing elements.

ANSWER: Air Force Special Operations authorities have explored your request and determined that permanently assigning Air Force Special Operations Forces in West Virginia would degrade our operational contingency response capability to key areas of this hemisphere and the overall quality of our mission training. The advantage provided by West Virginia's nearby mountain low level routes is offset by the lack of an active live fire range for our AC-130s and HH-53Hs. In addition, the density of air traffic routes over the state would preclude high altitude airdrops for our MC-130s and HH-53Hs and medium altitude live fire for our AC-130s.

QUESTIONS SUBMITTED BY SENATOR SASSER

NUMBER OF STRATEGIC BOMBERS

QUESTION: How many strategic bombers do we currently have in the force structure?

ANSWER: The Strategic Air Command has 167 B-52Gs and 96 B-52Hs for a total of 263 strategic bombers in its total aircraft inventory (TAI) force structure. Additionally, the B-52 force is supplemented by 61 (TAI) FB-111 medium bombers. We have accepted three B-1Bs, but the B-1B does not reach initial operational capability until December 1986.

QUESTION: We are building 100 B-1Bs and, according to unclassified testimony previously before the Armed Services Committee, we will build "an equivalent number of ATBs, the Stealth Bomber." Does that mean, as we edge toward the year 2000, with fifty-year-old B-52s which must be retired, we will be faced with a smaller bomber force structure than we have today?

ANSWER: Current heavy bomber force structure consists of 263 B-52s. The force structure will increase to (d) as the Air Force deploys 100 B-1Bs. Bomber force size in the late 1990s will depend on such factors as arms control, national policy and the threat. If required, [deleted].

ALTERNATIVE TO ATB AND B-52s

QUESTION: Is the Air Force planning for another bomber, other than the ATB, or a stand-off cruise missile aircraft to replace the B-52s in the next century? If so, at what cost?

ANSWER: The Air Force is not planning for another bomber other than the ATB.

B-52 RE-ENGINING AND NEW AVIONICS

QUESTION: Testimony previously before this committee indicated that, in order to keep the B-52s in the force beyond the early-to-mid 90s, they would have to be re-engined, hardened and provided with new avionics. Is this being planned for by the Air Force and at what cost?

ANSWER: There is no Air Force plan to re-engine B-52 aircraft at this time, nor is there a program to harden the aircraft and install a new avionics suite. Individual modifications have been performed to certain avionics systems and, where possible, these modifications have incorporated nuclear hardening e.g., the Offensive Avionics System (OAS).

UNIT COST OF B-1B

QUESTION: What is the current unit cost for the B-1B?

ANSWER: As of the FY 1987 President's Budget, the unit gross total flyaway is $205.9 million (TY) per aircraft. The unit total program cost is $271.8 million (TY) per aircraft.

ADVANCED TECHNOLOGY BOMBER

QUESTION: Testimony before this Committee has indicated that the B-1 will be able to penetrate Soviet air space well into the 1990s. Recent published reports indicate the Stealth may, in fact, even be vulnerable to older Soviet radars. In addition, previous unclassified testimony before the Armed Services Committee placed ATB cost at $270 million per plane in 1981 dollars. That is around $500 million a copy by the 1990s.

So, many observers are beginning to wonder if we should build more B-1s to save taxpayers money and achieve larger bomber force structure, before we move into production of the Stealth. Why is the Air Force opposed to that course of action?

ANSWER: President Reagan's two-bomber Strategic Modernization Program fields the B-1B as quickly as possible for a 1986 IOC and provides development of the ATB at the most prudent pace for deployment in the early 1990s. The two programs, as currently planned, are synergistic and will place maximum pressure on Soviet defenses. The current program of 100 B-1Bs followed by the ATB deployment in the early 1990s is the most cost effective program to address Soviet defenses and target structure into the next century. The two-bomber program is on track and should continue to be supported.

SUBCOMMITTEE RECESS

Senator STEVENS. The subcommittee stands in recess until 10 a.m., Friday, February 21, tomorrow, to review the Navy budget.

[Whereupon, at 12 noon, Thursday, February 20, the subcommittee was recessed, to reconvene at 10 a.m., Friday, February 21, 1986.]

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1987

FRIDAY, FEBRUARY 21, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, Andrews, Kasten, D'Amato, Rudman, Proxmire, Chiles, and Sasser.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE NAVY

U.S. MARINE CORPS

STATEMENT OF HON. JOHN LEHMAN, SECRETARY OF THE NAVY

ACCOMPANIED BY:
ADM. JAMES D. WAKTINS, CHIEF OF NAVAL OPERATIONS
GEN. P.X. KELLEY, COMMANDANT OF THE MARINE CORPS

OVERVIEW OF NAVY BUDGET REQUEST

BUDGET REQUEST

Senator STEVENS. Good morning. The subject of our hearing today is the Navy budget estimate for fiscal year 1987. The total request is $100.9 billion for Navy programs that are covered in the Defense Appropriations bill. This represents an increase of $5.3 billion over enacted appropriations and $8.9 billion, approximately 6 percent real growth, above the Gramm-Rudman-Hollings sequestered baseline.

Mr. Secretary, the budget you present today continues on the course this administration set 5 years ago to build and support a 600-ship Navy and revitalize the Marine Corps which we have been doing our best to support. Your fiscal year 1987 request provides for the initiation of production for several programs such as a new design attack submarine and the Trident II missiles. The $455 million advance procurement for the new submarine is in addition to four other attack submarines and one Trident also requested.

We will be interested to know what your projections are for resources needed to maintain that level if we attempt to expand and modernize the Navy at that rate within the resources we have available. We will be interested to know how you will continue to expand and modernize the Navy within constrained resources.

COMPARATIVE STATEMENT OF BUDGET AUTHORITY

For the record we would like to have the Navy submit a comparative statement of budget authority by appropriation account for fiscal year 1985 through 1987. Fiscal year 1986 estimates should reflect the post Gramm-Rudman-Hollings baseline. This display should include real growth calculations based on the latest economic indicators, by appropriation and in the aggregate.

In addition, we ask that the Navy submit a statement of unobligated balances by account for the lastest complete quarter and estimates for the end of fiscal year 1986.

[The information follows:]

COMPARATIVE STATEMENT OF DON BUDGET AUTHORITY

FY 1987 DON Budget
Budget Authority Comparison

	Budget Authority ($Mil)			% Real Growth	
	FY 1985	FY 1986	FY 1987	86-87	85-87
MPN	15,701.3	15,875.2	17,459.5	9.4	6.5
MPMC	4,944.9	4,853.9	5,333.4	9.4	3.4
RPN	1,127.0	1,264.6	1,527.6	19.2	28.9
RPMC	270.3	270.9	314.8	14.5	11.0
O&M,N	25,162.8	23,315.3	25,688.5	8.3	-1.3
O&M,MC	1,640.3	1,533.1	1,864.1	18.5	8.0
O&M,NR	828.6	851.1	975.9	11.9	13.1
O&M,MCR	58.8	54.4	65.3	16.1	3.2
APN	10,897.4	10,628.1	11,304.3	2.7	-3.6
WPN	4,353.6	4,959.9	6,095.4	18.6	30.1
SCN	11,635.5	10,350.3	11,046.2	3.5	-10.9
OPN	5,341.6	6,085.3	6,538.8	3.9	14.1
PMC	1,816.2	1,579.4	1,565.0	-4.1	-19.6
CDA	-	223.5	-	-100.0	-
RDT&E,N	9,197.4	9,583.7	10,586.8	6.3	6.9
NSF	2,187.1	607.2	478.5	-24.2	-79.6
MCSF	34.9	35.9	45.9	24.3	21.1
Subtotal	95,197.6	92,071.9	100,890.0	7.1	0.4
MCON	1,534.6	1,621.8	1,814.1	8.2	10.5
MCNR	60.8	39.8	44.5	9.8	-30.8
FH,N&MC	657.8	632.5	784.3	19.5	10.9
Subtotal	2,253.2	2,294.1	2,642.9	11.4	9.5
Total, all Appropriations	97,450.8	94,366.0	103,532.9	7.2	0.7
FFB Direct Loans	1,536.1	501.1	6.0	-98.8	-99.6
Trust & Receipts	28.1	-101.1	-101.6	-2.9	-429.0
Total, DON Budget	97,478.9	94,264.9	103,437.3	6.7	-1.0

STATEMENT OF DIRECT UNOBLIGATED BALANCES

DON FY 1986 Direct Unobligated Balances
(in millions of dollars)

Account	1st Quarter (31 Dec) Actual	End of FY 1986 Estimate
MPN	11,698.4	0.0
MPMC	3,584.3	0.0
RPN	969.1	0.0
RPMC	224.3	0.0
O&M,N	17,544.2	0.0
O&M,MC	1,256.7	0.0
O&M,NR	711.0	0.0
O&M,MCR	44.1	0.0
APN 84/86	625.3	0.0
85/87	2,463.0	808.9
86/88	10,679.7	2,444.7
Total	13,768.8	3,253.6
WPN 84/86	409.8	0.0
85/87	1,370.5	625.9
86/88	4,813.2	1,746.5
Total	6,593.5	2,371.5
SCN 82/86	1,059.1	0.0
83/87	3,995.1	3,094.6
84/88	3,242.1	2,386.0
85/89	4,488.8	3,092.0
	9,682.5	4,866.1
Total	22,467.5	13,438.6
OPN 84/86	461.0	0.0
85/87	1,479.8	591.1
86/88	5,153.8	1,840.6
Total	7,094.6	2,431.7
PMC 84/85	180.4	0.0
84/87	476.8	221.8
86/88	649.7	411.5
Total	1,306.9	633.3

CDA		235.0	184.2
RDT&E,N	85/86	401.0	0.0
	86/87	5,597.4	531.0
Total		6,998.4	531.0
MCON	82/86	74.7	0.0
	83/87	55.6	27.3
	84/88	149.7	44.7
	85/89	429.3	222.8
	86/90	1,656.7	507.7
Total		2,366.0	802.5
MCNR	82/86	.7	0.0
	83/87	.7	.2
	84/88	5.1	1.2
	85/89	11.6	4.6
	86/90	41.7	8.3
Total		59.8	14.4
FHCON	82/86	2.3	0.0
	83/87	9.8	4.2
	84/88	11.0	4.5
	85/89	15.4	11.1
	86/90	139.8	27.9
Total		179.3	47.8
FHOPS		432.6	0.0
DON Total;		97,553.7	23,708.5

INTRODUCTION OF SECRETARY LEHMAN

Senator STEVENS. Mr. Secretary, Admiral Watkins, General Kelley, we will print your statements in full in the record. We will ask you to summarize them as you see fit. This is sort of a relaxed day for all of us. We are not in session. So, we will not be interrupted by roll call votes.

I do believe we will have other members join us shortly.

Mr. Rudman, do you have any statement?

Senator RUDMAN. No, I am looking forward to the testimony.

Senator STEVENS. You may proceed.

600-SHIP NAVY

Secretary LEHMAN. I would like to submit my full statement for the record and give a short summary of it so that we can leave maximum time for questions.

The way I have approached the posture statement this year, as you will see, was to look back and review again the fundamental questions of why we asked for a 600-ship Navy 5 years ago with all that entails and the R&D and personnel programs that go with it.

SWITCH OF U.S. OIL DEPENDENCY TO PACIFIC AREA

Also, it reviews the sources of that requirement, the geography, the nature of our vital interests, the tremendous shift in patterns of both our dependencies on oil, and commerce, and our alliances, and the shift in the nature of the threat to those interests.

Mr. Chairman, you are particularly aware of one very major shift in our strategic balance in that we now get eight times as much oil from this hemisphere as we get from the entire Middle East. That is going to be a pattern of energy dependency long into the future.

We get far more oil from Alaska by sea today than we get from the Persian Gulf. So, these are new realities that mean that assumptions that were underlying much of our national policy right through the 1970's, are no longer valid. The idea of swinging our military capabilities from the Pacific in a NATO War is unthinkable today.

We have trade in the Pacific that is 130 percent greater than the trade with our Atlantic partners. The Soviets now have a fleet in the Pacific that they have deployed with forward bases a fleet that is designed not only to protect their historic vulnerabilities, but to interdict our own lifelines and alliances and to sever our vital links with our allies and our energy sources, and so forth.

So, as you review the budget, it is important to remember the basics of why we do need this Navy and what the logic is that has produced the program and the budget that we are putting before you. It is a simple, logical strategy that underlies what we have asked for.

5-YEAR BUDGET PLAN

Because of that simplicity and logic, you have seen no shift in it in the six times that I have appeared before you. You have never heard any change in the rationale and the structure of the Navy we need. Once again, we are presenting a 5-year plan and a budget for 1987 that carries forward that simple logic.

One of the things we are very proud of is that after 5 years of experience, we now can see a very clear path of the long-term stability and permanence of the fleet and the Fleet Marine Force that we need. We can say with confidence that we can keep and maintain this fleet in a ready state with ammunition sufficient for a prudent level sustainability for a long war, with the readiness and quality of personnel that are necessary to make it truly ready, and do it at a budget level that is quite affordable.

This is, of course, what everyone must face up to, living within one's means. The process of addressing the deficit is, of course, the central focus of Congress this year. We have demonstrated by results, not by pieties and hopes that we can afford this 600-ship Navy.

We have done it by applying some simple disciplines and principles of competition and free enterprise that have been in place now for a sufficient number of years to demonstrate that they are indeed the formula for long-term health of our defense force.

3-PERCENT REAL GROWTH BUDGET

We can live with the 3 percent real growth budget without any question. A stable certainty not in excess of 3 percent will give us sufficient resources to maintain the full ready fleet. If major reforms in the bureaucratic structure that we have allowed to grow up over the last 30 years are made to enable us to streamline the process, to get rid of so much of the built-in overhead from a system that some have called the largest socialist economic enterprise in the free world; if we are allowed to make those changes, we can produce an adequate defense for less than that.

COST-SAVINGS IN DEFENSE STRUCTURE

You are all familiar with the results in shipbuilding. We have averaged about $1 billion a year in cost underruns. Our Navy airplanes are now less expensive, in real terms, than they were 5 years ago. Our F-18's are $18.7 million whereas 5 years ago they were $22.5 million.

All of our Navy aircraft are on a firm fixed-price basis. All of our programs are now shifting to competition and to fixed price. This has been made possible because we have made an historic change in controlling goldplating, by instituting a process that at last has proved a formula to prevent the change-order culture that has done so much to generate the constant increases in price, above inflation, of aircraft and ships and defense articles over the past 30 years.

We know how to do it. We have the formula and have put it in place. It has produced the kind of savings that has allowed us to keep on course even though $70 billion has been cut from our budget since the President's request in the beginning of the administration.

So, we feel very confident about the future. We believe that we are going to be able to continue the successes that have been achieved during the last 5 years. We very sincerely appreciate the support and the intitiatives that this subcommittee has brought about enabling us to bring the kinds of discipline that have produced these results. We urge you to continue that support and to continue the initiatives that you have brought to each of the bills and the defense process itself in each of the last 5 years.

Thank you, Mr. Chairman.

Senator STEVENS. Thank you, Mr. Secretary.

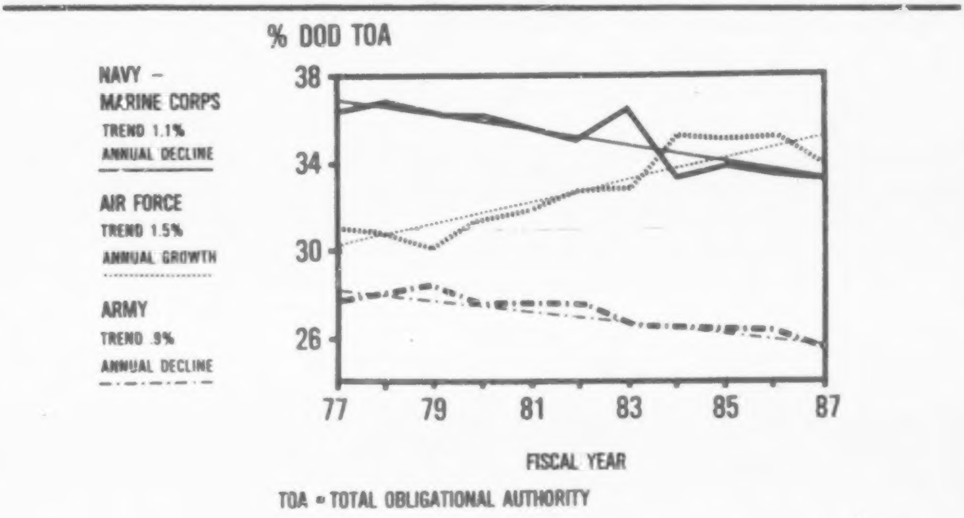
[The statement of Secretary Lehman follows:]

PREPARED STATEMENT OF HON. JOHN F. LEHMAN, JR.

SECRETARY OF THE NAVY

Mr. Chairman, I welcome this opportunity to appear for the sixth time to offer my assessment of the current posture of the Navy/Marine Corps team and to present the Department of the Navy budget request for Fiscal Year 1987.

Since my first report to you five years ago, President Reagan's Naval Recovery Program has more than doubled our overall naval capability. By cancelling plans for early retirement of two carriers and some thirty destroyers and amphibious ships, and by doubling the rate of new ship construction and reactivating battleships, our Navy has grown from 479 to 547 ships, with another 84 under construction; our Ready Reserve--including strategic sealift--has grown from 32 to 85 merchant ships; the measured readiness of our ships and squadrons has increased nearly 40 percent, and our ammunition stocks have nearly doubled. All this has been achieved with an average real growth in in the DON budget of only 5.6 percent from FY-82-86. The Navy Department share of the Defense budget has declined an average 1.1 percent during this same period.



DEFENSE BUDGET SHARE BY SERVICE

THE 600-SHIP NAVY: WHY DO WE NEED IT? HOW CAN WE AFFORD IT?

Now that the President's program is well established, it is timely to reexamine its premises as we plan for the next five years. Media-anointed experts have raised questions about the size, character, and complexity of the Navy and Marine Corps: Do we really need so many ships? Are the Navy and Marine Corps effective in helping to deter Soviet aggression--across the full spectrum of violence, from terrorism to nuclear war? Do we have a strategy that guides the planning and training of our forces? Is it the correct strategy? If it is, what have we accomplished to date in ensuring we can carry it out, and are we building the right types and numbers of ships to execute it in the future? Finally, can this nation afford to sustain a 600-ship fleet--not only well-equipped but properly manned--for the long term? Now that Gramm-Rudman-Hollings has become law and retrenchment is the theme of the hour, the answers to these questions take on added significance.

Why 600 Ships?

To understand how we arrived at the size of our planned fleet of ships, we must begin by discarding the idea that this number has sprung, full blown, from the brow of some would-be Napoleon of the high seas. Since World War II, maritime force planners have found themselves at the mercy of three enduring elements:

Geography

Water covers three quarters of the world; and the United States is an "island continent" washed by the Atlantic and Pacific oceans.

Vital Interests of the United States

These are expressed in the web of more than 40 treaty relationships that bind us to mutual defense coalitions around the world. These relationships shape our national security requirements--together with the energy and commercial dependencies that support our economy in peace and in war.

The Soviet Threat

Whatever its original rationale, the Soviet Navy's postwar expansion has created an offense-oriented blue water force, a major element in the Soviet Union's global military reach that supports expanding Soviet influence from Nicaragua to Vietnam to Ethiopia. From the Baltic to the Caribbean to the South China Sea, our ships and men pass within yards of Soviet naval forces every day. But familiarity, in this case, is breeding a well-deserved respect; they are good and getting better.

The Navy's recently updated publication, Understanding Soviet Naval Developments, provides the facts about the Soviet Navy. Every American should be aware, for example, that Soviet nuclear submarines operate continuously off our coasts. "Victor"-class nuclear attack submarines are routinely found lurking near many of our principal naval ports. Soviet surface units are now making regular deployments to the contentious and vulnerable chokepoints of the Caribbean Sea and Gulf of Mexico. Worldwide, we find the Soviet Navy astride the vital sea-lanes and navigational chokepoints, through which most of the Western world's international trade must pass. This is the new reality. The pattern of Soviet naval deployments has revealed itself only over the last several years. These deployments constitute a post-World War II change in the global military balance of power that has been surpassed only by the advent of thermonuclear weapons. No planner, civilian or military, can ignore the growing dimensions of Soviet maritime power.

The past year alone has provided cause enough for alarm. In mid-1985 naval forces from the Soviet Northern and Baltic fleets conducted a major open-ocean exercise in the North Atlantic, Norwegian and North Seas. Nearly three-quarters of all combatant ships and submarines from these fleets were deployed. The exercise involved submarine, surface ship and aircraft strikes on Soviet surface combatants simulating NATO battle groups moving into the Norwegian Sea. The exercise included the most modern Soviet major surface combatants, such as the aircraft carrier KIEV and the nuclear-powered battle cruiser KIROV. Soviet anti-carrier strike, reconnaissance and anti-submarine aircraft flew around the clock. The exercise was similar in activity level and realism to an unprecedented Soviet Pacific fleet exercise conducted in April which centered around KIEV's sister ship, NOVOROSSIYSK.

Two other significant events marked the Soviet naval calendar in 1985: In the first, Fleet Admiral of the Soviet Union Sergei G. Gorshkov, a flag officer since 1941 and leader of the Soviet Navy since 1956, stepped down, to be replaced by nuclear submariner Vladimir N. Chernavin. Chernavin is known to be more of a "team player" than Gorshkov and has advocated closer cooperation with Soviet land forces in his published writings. On other matters, however, he is not likely to change the pull or direction of the growth in capability of the Red Fleet established over three decades by his illustrious predecessor.

The other major development in Soviet seapower was the launching of the 65,000-ton nuclear-powered aircraft carrier and, we believe, the immediate laying of the keel for a second unit of the class. These ships--and--the enormous TYPHOON-Class ballistic missile submarines--may be said to mark the culmination of Admiral Gorshkov's long career. For the first time Soviet carrier battle groups will be able to provide visible and truly potent seaborne presence wherever Soviet "state interests" dictate. Along with such units as the KIROV-Class nuclear-powered battle cruisers--the third of which is now under construction--the Soviet carriers will be able to bring fixed-wing strike aviation and local air-superiority to bear in support of Soviet offensive fleet operations, and in support of clients and proteges, such as Nicaragua, Libya, Vietnam and Angola. Just as important, these carriers will bring the enormous benefit of air cover to the Soviet surface fleet permitting them a new dimension of survivability and flexibility.

What is particularly disturbing about the "fleet that Gorshkov built" is that improvements in its individual unit capabilities have taken place across broad areas. Submarines are faster, quieter,and have better sensors and self-protection. Surface ships carry new generations of missiles and radars. Aircraft have greater endurance and payloads. And the people who operate this Soviet concept of a balanced fleet are ever better trained and confident.

Two operational trends are significant. First, the Soviet Pacific Ocean Fleet continues to be built up in size and--more importantly--capability. 1985 saw the transfer to the Pacific of the second KIROV-Class battle cruiser and its first examples of the SOVREMENNYY and UDALOY guided missile destroyers; that fleet already had two of the three completed KIEV-Class V/STOL carriers. The second trend is toward greater security for the ballistic missile submarine force, which the Soviet Navy considers a prime responsibility. Increasingly, that force is concentrated in the waters of the Arctic, protected by layers of surface, submarine and air forces as well as by the ice cap.

What determines the size of the Navy?

Geography, alliances, and the Soviet threat combine to dictate the actual numbers of ships--the "size of the Navy"--required to fulfill our commitments in each of our maritime theaters. Before reviewing in detail the forces we need in each theater, some observations are in order:

Any view of the global disposition of the U.S. Navy and Marine Corps reveals that we often deploy in peacetime very much in the same manner as we would operate in wartime. For purposes of deterrence, crisis management, and diplomacy, we must be present in the areas where we would have to fight if war broke out. Of course, the operational tempo is different--a roughly three-to-one ratio in wartime, as compared with peacetime.

We also train as we intend to fight. A full-scale general war at sea would rarely find a carrier battle group operating alone. So we train often in multiple carrier battle forces.

Allied Navies

Our maritime security depends on significant assistance from allies in executing our missions. Fortunately, we count among our friends all of the world's great navies, save one. Clearly, in areas such as diesel submarines, frigates, coastal patrol craft, minesweepers, and maritime patrol aircraft, allies of the United States have assets absolutely essential for sea control in war and peace. In some regions, such as the Eastern Atlantic and the waters surrounding the United Kingdom, our allies supply a majority of the antisubmarine capability to counter the Soviet threat. In fact, if we could not count on our allies, we would require a U.S. fleet much larger than 600 ships to deal with the 1,700 ships and submarines that the Soviets can deploy against us. But the world's greatest navies are on our side, and this gives a tremendous advantage to the U.S. Navy and a significant cost savings to the U.S. taxpayer.

Shifting Trade Dependency

America's increasing commercial and energy interdependence with Asia, and the growth of the Soviet Pacific Fleet--now the largest of the four Soviet fleets--have negated the so-called "swing strategy" of the Fifties, Sixties, and Seventies, which planned to reinforce the Atlantic Fleet with combatants from the Pacific in time of crisis. Today, the United States has an Asian orientation at least equal to its historic engagement in Europe. Existing treaty relationships in the Pacific have been augmented by growing commercial connections. For example, in 1980, the value of U.S. trade with the Pacific rim nations was roughly equal to trade with the country's Atlantic partners. Four years later, Pacific trade exceeded that with Western Europe by $26 billion.

Shifting Oil Dependency

Similarly, oil dependencies have shifted tremendously in the last five years. This forces America to reconsider the priorities of naval deployments in the Northern Pacific and Caribbean regions. The reorientation of U.S. sources for crude oil--on a hemispheric axis--is a long-term geopolitical reality that has gone largely unnoticed. Western dependency on Middle Eastern oil is still debated at length as to its impact on our military thinking and force planning. But we must also take into account that, in 1985, the United States imported eight times as much oil by sea from the Western Hemisphere as it received from the entire Middle East. Oil from Mexico has increased to almost one-fourth of our imports, while oil from Saudi Arabia has dropped to less than 5 percent of the U.S. import market. We no longer depend primarily on the Middle East and Persian Gulf supply for our vital energy needs. Instead, the locus of our oil trade is in the Western Hemisphere: Alaska, Canada, Mexico, Venezuela, and the Caribbean area.

With these observations as background, let us review our forces in the main geographic areas: the Atlantic, the Mediterranean, the Pacific, and Indian Ocean-Persian Gulf.

The Atlantic

The large Atlantic theater encompasses the North Atlantic, the Norwegian Sea, the Northern Flank of NATO including the Baltic throat, the South Atlantic, the Caribbean, and the Gulf of Mexico. It includes the coasts of South America and the west coast of Africa, all vital sea-lanes of communications. And it involves the Mediterranean and the Middle East. The U.S. Navy operates in the Atlantic theater with two fleets, the Sixth and the Second.

The Sixth Fleet in the Mediterranean is the principal fighting force of the NATO Southern Europe Command and provides strike, amphibious, anti-air superiority, antisubmarine, and close air support for the entire Southern Flank of NATO--a principal makeweight in the balance in the Central Front.

In addition, the Sixth Fleet is the principal naval force that supports our friends and allies in the Middle East. The threat there is significant. The Soviets maintain a fleet in the Black Sea and a deployed squadron in the Mediterranean. In wartime, we expect to see there also Soviet naval strike aircraft, a formidable number of diesel and nuclear submarines, and a full range of missile cruisers, destroyers, and other smaller combatants.

To deal with this threat, as we do in all our planning, we start with a base of allied forces in the areas under consideration. The navies of our allies are good. For example, we count on them to provide about 140 diesel submarines, which are effective for coastal and area defense, for establishing and maintaining barriers, and for certain other useful missions.

In wartime, U.S. forces in the Sixth Fleet would have to include three or four carrier battle groups, operating to meet NATO commitments. We would also need to deploy a battleship surface action group and two underway replenishment groups. In peacetime, we average over the year one and one-third carrier battle groups deployed in the Mediterranean.

The Second Fleet. This is the heart of the Atlantic strike fleet for NATO. It is responsible for naval operations in the North Atlantic, the Eastern Atlantic, Iceland, the Norwegian Sea, the defense of Norway, and the entire Northern Flank including the North Sea and Baltic throat. It must simultaneously accomplish any naval missions required in the Caribbean, where we now face a very large Soviet and Cuban naval presence; in the South Atlantic, where we have vital sea-lanes; and along the West African sea-lanes, where the Soviets now deploy naval forces continuously.

For the Second Fleet, in wartime, we must plan to have four or five carrier battle groups, one battleship surface action group, and three underway replenishment groups. Each carrier brings the equivalent firepower of 40 World War II carriers and can deliver accurate strike ordnance on target equal to 800 B-17s every day. In peacetime, we generally run higher than this, because most of our principal training occurs in the Second Fleet's operating areas. Today, we have six carrier battle groups cycling in the Second Fleet.

The Pacific

Clearly, our increasing commercial interests and historic security ties in the Pacific impact on our naval planning for the area. If we are to protect our vital interests, we must have forces available to deploy--not only to the Atlantic theaters and the Sixth and the Second fleets--but also to the Pacific simultaneously, to the Seventh and the Third Fleets and the Middle East Force of the Central Command. We cannot abandon one theater in order to deal with the other. The great paradox of the 1970s was the reduction of the fleet's size so that it could only be employed in a "swing strategy"--just as that strategy was being rendered obsolete by trade, geopolitics, and the growth of the Soviet Navy.

The Seventh Fleet is our forward Western Pacific fleet, which meets our commitments to Japan, Korea, the Philippines, Australia, New Zealand, and Thailand, and in the critical straits of Southeast Asia, as well as the Indian Ocean. In wartime, we would need to deploy five carrier battle groups to the Seventh Fleet, two battleship surface action groups, and four underway replenishment groups. In peacetime, we average over the year the equivalent of one and one-third carrier battle groups in the Western Pacific.

We do not have a separate fleet in the critical area of Southwest Asia, the Indian Ocean and the Persian Gulf, although some have proposed the re-creation of the Fifth Fleet for that purpose. In peacetime, we have the Middle East Force of the Central Command and elements of the Seventh Fleet, normally a carrier battle group.

In wartime, we plan for two of the Seventh Fleet carrier battle groups to meet our commitments in the Indian Ocean, Southwest Asia, East Africa, the Persian Gulf area, and Southeast Asia. Notionally, a Seventh Fleet battleship surface action group and one underway replenishment group would also be assigned to operate in these areas.

The Third Fleet has responsibility for operations off Alaska, the Bering Sea, the Aleutians, the Eastern Pacific, and the Mid-Pacific region. In wartime, there would be considerable overlapping and trading back and forth between the Seventh and Third Fleets. This happened in the Pacific during World War II. To cover that vast area, we must assign two carrier battle groups and one underway replenishment group. (See illustration next page.)

OPTEMPO in Peace and War

These requirements compel us to deploy a 600-ship Navy. In peacetime, we deploy to the same places we must control in war, but at one-third the tempo of operations. This allows a bearable peacetime burden of six-month deployment lengths and 50% time in homeport. Looked at either way, we require the same size fleet to meet peacetime deployments as we do to fight a global war. Taken together, they add up to the following:

CURRENT NAVY FORCE REQUIREMENTS

	PEACETIME MARITIME STRATEGY	WARTIME MARITIME STRATEGY
	SIXTH FLEET	
CVBG	1.3	4
BBSAG	.3	1
URG	1	2
	SECOND FLEET *	
CVBG	6.7	4
BBSAG	1.7	1
URG	4	3
	SEVENTH FLEET * *	
CVBG	2	5
BBSAG	.5	2
URG	1	4
	THIRD FLEET *	
CVBG	5	2
BBSAG	1.5	-
URG	4	1

* INCLUDES FORCES IN OVERHAUL   * * INCLUDES INDIAN OCEAN FORCES

CVBG=CARRIER BATTLE GROUP. BBSAG=BATTLESHIP SURFACE ACTION GROUP. URG=UNDERWAY REPLENISHMENT GROUP

-Fifteen carrier battle groups

-Four battleship surface action groups

-One-hundred attack submarines

-Lift for the assault echelons of a Marine Amphibious Force and a Marine Amphibious Brigade

-An adequate number of ballistic missile submarines

When escort, mine warfare, auxiliary, and replenishment units are considered, about 600 ships emerge from this accounting--a force that can be described as prudent, reflecting geographic realities, alliance commitments and dependencies, and the Soviet fleet that threatens them. Unless Congress reduces our commitments or the Soviet threat weakens, there is no way to reduce the required size of the U.S. fleet and still carry out the missions assigned to the Navy.

Does the Navy have a role in the national strategy?

While the Carter administration questioned whether the Navy could influence a "short war" in Central Europe, such a proposition is indefensible today. The coalition of free nations bound together in NATO must have maritime superiority as a prerequisite for any defense strategy. Maritime superiority alone may not assure victory, but the loss of it will certainly assure defeat--and sooner rather than later. The chronicles of warfare from the classical era forward are a consistent testament to the influence of sea power upon history, in which great continental powers do not long prevail against an opponent with mastery of the seas. Today, continental defense in NATO rests on early achievement of maritime superiority. The Soviet Union, as evidenced by its ongoing naval expansion, understands the experience of history far better than our trendier military academics. It is not accidental that the free world alliance is named "North Atlantic" while its totalitarian adversary takes its name from a land-locked city.

Does the Navy have a strategy?

Consider the charge leveled by some parlor room Pershings that our current naval buildup lacks an underlying strategy.

Not since the days of Theodore Roosevelt have the Navy and Marine Corps exhibited such a strong consensus on the comprehensive strategy which now forms our naval planning. Briefly stated, our strategic objectives are the following:

-To prevent the seas from becoming a hostile medium of attack against the United States and its allies

-To ensure that we have unimpeded use of our ocean lifelines to our allies, our forward-deployed forces, our energy and mineral resources, and our trading partners

-To be able to project force in support of national security objectives and to support combat ashore, should deterrence fail.

To achieve these objectives, we need a maritime strategy at once global, forward deployed, and--with our allies--superior to our probable opponents. Global, because our interests, allies, and opponents are global; forward deployed, because to protect those interests and allies, and to deter those opponents, we must be where they are; superior, because if deterrence fails to prevent a conventional war at sea, it is better to win than to lose.

Does the Navy have the correct strategy?

Today's debates would benefit from a more precise understanding of the role of strategy. Strategy is not a formula for fighting each ship and deploying each tank in the battles that may take place around the world. That is not the function of the military establishment inside the Washington Beltway. Such is the proper function only of the theater commander who is given the responsibility to carry out the defense objectives set by the national command authorities.

Beyond the central concept of global, forward-deployed, and superior naval forces, strategy's role is to give coherence and direction to the process of allocating money among competing types of ships and aircraft and different accounts for spare parts, missile systems, defense planning, and the training of forces. It provides guidelines to aid us in allocating both resources and shortages.

Title 10 of the U.S. Code charges the Secretary of the Navy with ensuring the highest level of training appropriate to the responsibilities placed upon both the Marine Corps and the Navy. That is what strategy provides to us--a framework within which to train. One will search in vain, however, for a Navy cookbook that tells on-scene commanders when to move aircraft carriers, or how or where to move attack submarines or Aegis cruisers at any given point after a conflict commences. There should never be any such cookbook and certainly it should never come from Washington. Those who criticize our strategy for being the wrong cookbook or for not having a cookbook do not understand strategy.

Other critics argue that our Navy should be less global, less forward-deployed, or less superior, with the resources saved to be poured into a stronger continental defense. To be less global means to abandon some area of our vital interests. To believe that in the case of the Northern Flank of NATO, for example, a "passive" defense line thrown across the Greenland-Iceland-United Kingdom Gap will somehow protect our sea-lanes or defer an engagement with Soviet forces demonstrates a lack of understanding of the fundamental mechanics of war at sea and the workings of NATO and the Soviets' own operational requirements. No coalition of free nations can survive a strategy which begins by sacrificing its more exposed allies to a dubious military expediency. To suggest that naval support of Norway or Turkey or Japan is too dangerous because it must be done close to the Soviet Union is defeatist. To suggest that such a strategy is provocative of the Soviets just indicates the lengths to which some critics will go, in order to portray Soviet intentions as solely defensive.

As for strengthening our continental defenses, we and our allies are also doing just that. To discard maritime superiority in an attempt to match the larger Soviet ground forces, however, would give us neither conventional deterrence on land nor secure access by sea unless the Western democracies are prepared to militarize their societies to an unprecedented, and unwise degree.

Training to the Strategy

The global maritime strategy has been continuously refined and applied to training. That training, like the strategy, is designed to incorporate not only Navy and Marine Corps forces, but is critically dependent on those of our sister services and the forces of our allies. By eliminating needless overlap in total capabilities, we believe our program will leave no vital maritime tasks uncovered. The past five years have seen major new agreements between the Navy/Marine Corps and the Air Force, the Army, and the Coast Guard. In addition, we have made extensive progress in multi-lateral and bi-lateral agreements with allied navies and air forces.

The fact that U. S. Air Force AWACS, B-52 bombers, and fighters are now an integral part of every significant naval exercise and theater strategy attests to the fact that while inter-service rivalry is strong on the playing fields of service academies, it does not interfere with the effective integration of our operating forces.

Our maritime strategy is continually tested, refined, and updated through several important processes. The Navy and Marine Corps senior operational commanders review it individually and as a group . It is examined, challenged, probed, and refined at the international level by senior American and allied military and civilian officials. We test it repeatedly in war games and simulations, especially the annual global war games at the Naval War College in Newport, RI. It is used as the planning base for our major exercises--Navy, joint, and multi-national--and the exercises themselves become the crucible for testing its refinement and challenging its assumptions. Every exercise provides useful lessons learned, to be fed back into the planning process.

In addition, Lessons Learned from every real-world crisis or conflict are applied immediately and integrated into our strategy. The Falkland Islands War, our own and Israeli operations in Lebanon, the Grenada intervention, and our constant monitoring of Soviet exercises and deployments are all examples. Much of our budget request each year has been modified since the previous year by the lessons learned from intervening events as applied to our overall strategy. In December 1983, as a result of lessons learned from the Falklands, we accelerated installation of the PHALANX close-in weapons system on ships serving in the dangerous waters of the Middle East. As a result of Grenada operations' analysis, we have modified communications equipment to improve interoperability in the future with U. S. Army ground forces.

Also, in response to urgent requirements in Lebanon in 1983, the Navy purchased MASTIFF mini-RPVs (Remotely Piloted Vehicles) from Israel. Last year we competed a contract for a short-range Navy-Marine Corps RPV which was won a few weeks ago by AAI, a Baltimore firm representing the Israeli firm, Mazlat. Deliveries will start to the Marines in September. We also awarded a contract last month for 500 Samson decoys, designed to imitate strike aircraft. These are advanced versions of the decoys used so successfully by the Israelis in the Bekaa Valley in 1982. The contractor will later train and qualify a second source.

Exercises and Operations

The highlights of our training and exercise program were the two big multi-battle group exercises conducted with our sister services and allies in the Northwest Pacific and Northeast Atlantic--FLEETEX 85 and OCEAN SAFARI 85. FLEETEX was the largest U.S. fleet exercise held in peacetime since World War II. OCEAN SAFARI was the largest NATO maritime exercise ever held. In OCEAN SAFARI, the "Safari" assembled off the East Coast of the United States and fought its way across the Atlantic, moved north of England and east of Iceland, and ended up in the Norwegian Sea. Approximately 160 ships and 280 fixed-wing aircraft and helicopters operated for four weeks in this environment against 19 real Soviet ships and submarines and 96 Soviet aircraft sorties. Ten NATO allies furnished forces.

Other deployments and exercises have focused on other dimensions of the strategy. We operated in the Baltic and Black Seas. UNITAS XXVI honed our skills and those of our South American allies in the waters of the South Atlantic and Southeast Pacific. The West African Training Cruise performed similar functions along the vital Southeast Atlantic SLOCs. Ships of the Navy's Military Sealift Command recently took part in REFORGER 86, transporting more than 3,000 pieces of equipment from the United States to Germany. On the West Coast, reservists from the Navy, Marine Corps, and Army loaded hundreds of tons of simulated ordnance onto a merchant ship under the supervision of Coast Guard Reserve Marine Safety inspectors in MAT MOBEX 86. Dozens of similar but much smaller operations and exercises occurred throughout the year.

The maritime strategy embraces more than preparation for global operations against the Soviets, of course. It uses naval forces to deter war and--should this fail--to use force where necessary throughout the warfare spectrum. In 1985, the highlight of our peacetime and crisis operations was the contribution the Navy made toward resolution of the ACHILLE LAURO piracy when four Navy F-14s from USS SARATOGA (CV 60) intercepted and escorted an Egyptian airliner carrying the pirates to the NATO base in Sigonella, Sicily. Said Secretary of Defense Weinberger: "The work of the Navy planes--the carrier and the F-14s--cannot be commended too highly because it is a difficult task on such very short notice to both assemble the force and make an intercept in international commercial aviation routes."

In a further response to international terrorism, in January we moved the SARATOGA battle group from the Indian Ocean to the Mediterranean as a response to Libyan terrorist support and provocations, demonstrating once again the utility and flexibility of mobile naval power.

OPTEMPO

Last year at this time I told you that it had been one of my great disappointments that despite adding some 50 ships to our operational fleet by then, we had been unable to make an appreciable reduction in OPTEMPO and the excessive time that naval personnel must spend away from their families. Family separation remains the number one reason why young officers and enlisted men and women choose to leave the Navy. I told you last year that making improvements in this area was a top goal of the next four years.

I am pleased to report this year that we are well on the road to improvement in this vital area. Cuts in deployment schedules have been ordered to eliminate excessive at-sea periods for ships and aircraft squadrons. Sailors are beginning to see changes now. Battle groups will spend a maximum of six months at sea and sailors will be assured they will be in home port at least 50 percent of the time. There will be major deployment turnaround ratios of 2:1 or better, which really means if you're deployed for six months, you're home for 12.

Two ways in which we plan to decrease the number of ships and people on extended deployments are by selectively alternating battleships with carriers and decreasing the size of battle groups.

Strategic Homeporting

In the 1970s the Navy budget was cut 22 percent, adjusted for inflation. The fleet shrank from 950 to 479 ships and many naval bases were closed by necessity. Drastic shortages of funds forced a consolidation that brought military vulnerability. Today we have 129 ships based in the Norfolk area, 105 in San Diego, and 68 in Charleston. President Reagan's expansion adds 120 ships to our fleet, and it is necessary to homeport them in the least vulnerable, most affordable way. A major initiative derived from our strategy has been our effort to decrease the vulnerability of our fleet and our vital merchant ports through an expanded Strategic Homeporting program. We are currently executing four major homeporting initiatives. We are homeporting a battleship surface action group in Staten Island, New York; a carrier battle group in Everett, Washington; a battleship surface action group, carrier battle group, and other vessels in Corpus Christi, Pascagoula, Lake Charles, New Orleans, Mobile, and Pensacola; and an expanded battleship surface action group in San Francisco, Long Beach, and Pearl Harbor. We have done this through competition and working with the local communities to find the lowest possible cost solutions.

A valuable dividend from these initiatives will be the large expansion of our private enterprise industrial support base. The Navy will derive great savings from the increased competition and much healthier mobilization potential from spreading the work in maintenance repair and support services. Dispersal of forces to more ports and to less concentrated ports improves our defensive posture, complicates enemy conventional mine and cruise missile warfare targeting, and minimizes the risks associated with a relatively simple but properly placed attack from the Soviet non-strategic submarines that now patrol our coasts. Homeporting in more diverse geographical locations on each coast provides us an opportunity to train and operate in a variety of environments, with less wasted transit time. Homeporting in Puget Sound and New York provides permanent naval capabilities to the Northeast and Northwest sealanes and ports. Dispersed homeports in the Gulf provide the same presence to the sealanes through which must pass most of NATO's vital reinforcement shipping, now heavily targeted by the Soviet and Cuban Navies. This new capability in the Gulf will greatly enhance our responsiveness in Caribbean contingencies.

Security

The best strategy, tactics, and equipment will count for little in a war with the Soviets if their key ingredients are compromised through espionage, theft, or treason. At sea and ashore we employ operations security, emission control, and other specialized methods to counter Soviet intelligence. But the Walker espionage case revealed dramatic shortcomings in Navy security. As a result of that case, we have moved immediately to make corrections. We have now reduced the number of personnel with access to classified information by 42 percent. We have withdrawn almost 200,000 clearances and lowered a further 130,000. As a precautionary measure, we have replaced about half the officers and senior enlisted personnel who maintain classified communications manuals. We have stepped up our physical security posture across the board, including improving our small arms training, beefing up our waterfront and shipboard security, and establishing anti-terrorism training and weaponry improvement programs. In August of last year, the Naval Investigative Service Command (NAVINSERVCOM) was reorganized with extended powers over its predecessor, the Naval Investigative Service, to enhance security, counterintelligence, and criminal investigations within the Department of the Navy.

What has been accomplished during the past five years?

Personnel

The past five years have seen the most dramatic change in the manning of the Navy and Marine Corps in the 210 years of our history. From the worst retention and recruiting in postwar history in 1979 and 1980, we have risen to the highest figures achieved since we began keeping records. We are meeting 100 percent of our recruiting goals, and have achieved 97 percent non-prior-service high school diploma graduates in the Marine Corps and 89 percent in the Navy. In virtually every category we have increased retention to near-record highs: in skilled enlisted ratings, in pilots and naval flight officers, in nuclear-trained and surface warfare officers. From a situation five years ago when some of our ships could not deploy on schedule because the fleet was manned at only 91 percent, we are now at 100 percent ship manning for a Navy that has grown by more than 65 ships.

The reorganization of the Naval Reserve to a "horizontal integration" with the active force has had the effect of shifting a substantial portion of our force structure manning to the Ready Reserve. In FY 1987, 43 ships will be manned by Selected Reserves, in addition to the augmentation of essentially all naval units by Selected Reserves upon mobilization. The 15th active carrier air wing has been deleted from the program and the 15th carrier will carry a Reserve Air Wing. This increased dependence on the use of the Ready Reserve has enabled us to greatly reduce our original estimates of required active end-strength growth.

Aviation Safety

A very significant indicator of the greater proficiency of our personnel is the aircraft accident rate. This past year, 1985, was the safest year for combined (Class A, B, and C) mishaps in naval aviation history. For the second year in a row, we had less than 4 mishaps per hundred thousand flight hours. The number of aircraft destroyed last year was also the lowest in history. That has brought about dollar savings in uncrashed aircraft in 1985 alone of nearly $235 million and the avoidance of much human tragedy.

Families

The Department of the Navy is continuing its efforts to improve readiness and retention through support of its military and civilian families. We are at the forefront in our emphasis on family support through Navy and Marine Corps Family Service Centers, day care centers, and the Spouse Employment Assistance Program.

Readiness

The fleet is more ready to go in harm's way than at any time in recent peacetime history. In the past five years, overall combat readiness for surface ships has improved by 94 percent, for nuclear attack submarines by 69 percent and aviation squadrons by over 200 percent.

The net increase in spare parts and ammunition has been far greater than the actual increase in funding applied to it. The reason has been the dramatic reforms in the way we have managed these funds. Despite the misinformation provided by self-appointed experts on defense procurement, the Navy initiated a major reform of its spare parts buying under the direction of the Secretary of Defense. Nearly all of the horror stories appearing in the press were the result of a vigorous pursuit of abuse by Navy personnel at all levels. We have been able, for instance, to raise competition in our purchase of aviation spares from a deplorable low of 6.9 percent in 1982 to the current level of 31.9 percent and climbing to an FY 1986 goal of 40%. As a result, the increase of end items to the fleet is substantially more than the increase of funding would suggest.

Sea-based Nuclear Deterrent

The modernization of our sea-based leg of the strategic deterrent is proceeding well. We have added seven OHIO-Class TRIDENT SSBNs to the fleet since 1981, with six others authorized. The latest addition to the fleet was ALASKA (SSBN 732) commissioned in January 1986. During sea trials, TRIDENT submarines have met or exceeded all of their design specifications.

The first eight OHIO-Class TRIDENT SSBNs are outfitting with the TRIDENT I (C-4) missile, joining 12 POSEIDON SSBNs equipped with TRIDENT 1. Over the past five years the development schedule of the TRIDENT II (D-5) was begun and deployment accelerated, with an initial operational capability (IOC) of 1989. In addition, we have greatly strengthened command and control of our strategic forces, including construction of the Extremely Low Frequency (ELF) communications system, and have begun to procure a follow-on TACAMO command and control aircraft. Two years ago we began deploying TOMAHAWK sea-launched cruise missiles equipped with nuclear warheads for theater nuclear deterrence. They are now operationally capable on attack submarines, cruisers, destroyers, and reactivated battleships. This highly reliable, accurate, low cost weapons system is a tremendous force multiplier that adds a new and very stabilizing dimension to our deterrent posture, and matches a capability inherent in the Soviet fleet since the early 1960s.

Shipbuilding

Five years ago the President set a goal of doubling the naval shipbuilding program. We have maintained that ambitious goal despite continuing cuts from the original budget estimates. We have brought dramatic new efficiency, discipline, and cost savings to the management of Navy shipbuilding.

From the 479 battle force ships in the fleet when President Reagan took office, the fleet has grown to 547 ships today and 553 by the end of FY 1986, reaching 600 by the end of 1989. In 1985 we delivered 19 new battle force ships, including two TICONDEROGA-Class AEGIS cruisers and three LOS ANGELES-Class attack submarines. Also, two Maritime Pre-positioning Ship squadrons became operational in the Atlantic and Indian Oceans, with a third scheduled to be positioned in the Western Pacific in the Fall of 1986. There are currently 84 naval ships now under construction, conversion or reactivation, at 17 different yards through the United States.

By canceling the Carter Administration plans to retire early the aircraft carriers MIDWAY (CV 41) and CORAL SEA (CV 43), and the DDG 2 and DDG 37 Class destroyers, and by reactivating the battleships, we have been able to expand the fleet rapidly over the past five years without sacrificing investment in new construction for the 1990s and the next century. An added benefit of this approach has been a major influx of new business and employment in the shipyards doing conversion, reactivation, overhaul, and ship repair. Because of the major emphasis on readiness maintenance spending, we have been able to reduce the backlog of ships awaiting overhaul from 16 in 1981 to zero today even as we have increased the fleet by more than 66 ships.

A substantial benefit to the economy and to deficit reduction has been the immediate creation of very substantial numbers of jobs in a declining shipbuilding and repair industry. The Navy shipbuilding and repair programs now account for over 85 percent of all employment in that industry in the national shipyard mobilization base. On the larger impact of Navy shipbuilding, it has been estimated that every billion dollars in the Navy shipbuilding program creates 26,000 direct jobs and 12,000 secondary jobs.

Aircraft

In each of the eight years preceding the Reagan rearmament program, the Department of the Navy was not able to procure enough aircraft to replace those lost through peacetime attrition. In each of the past five years, however, naval aircraft procurement has been nearly doubled from the average levels of the preceding four, and procurement of aircraft spares has more than tripled. These high rates of procurement have been maintained because of an historic reversal of cost trends in naval aircraft programs. For the fourth straight year, all naval aircraft procurement programs are on a firm-fixed-price contract basis, precluding the possibility of production cost overruns, and the annual prices of our new tactical aircraft have actually been coming down. Competitive pressures have been maintained by keeping four separate fighter and attack aircraft in production. In addition, we have been able to maintain stable production rates through most of our aircraft lines.

In 1985 we deployed two of our newest weapon systems, the F/A-18 HORNET and the LAMPS MK-III with the SH-60B SEAHAWK helicopter, for the first time, as part of the USS CONSTELLATION (CV 64) battle group. Also, in 1985, we received the twelve F-21A KFIR fighters we have leased from Israel providing us with uniquely realistic adversary aircraft against which our aviators can train.

As part of the Reagan Administration emphasis on the Ready Reserve, new reserve units have been established and our reserve pilots are flying front line Navy aircraft. Some of these flying units are augmentation units to fill out fleet squadron strength upon mobilization, and others are commissioned squadrons.

Weapons and Ammunition

In the decade preceding the Reagan Administration, the Marine Corps was unable to procure sufficient ammunition to replace the stocks expended in normal peacetime training. As a result, sustainability and war reserves disappeared. During that same period, the Navy was held to such low levels of procurement of ammunition, missiles, and torpedoes that four years ago we did not have sufficient stocks to load out the reduced fleet of 479 ships--even once--with full magazines. We had less than a week's supply of the most important air defense munitions. Such enormous shortages created over a decade of unilateral disarmament in the 1970s are not going to disappear overnight. But five years of sustained growth in our ammunition accounts has now begun to refill our munitions stockpiles.

From FY 1981 to FY 1986, actual in-bin munition levels for Navy and Marine Corps major weapons (e.g. missiles and torpedoes) increased by 77 percent. (From FY 1986 to FY 1988, when current contracts will be delivered, these levels will increase by another 170 percent.) Despite the fact that there is a two to three year lag between funding and delivery, our overall ordnance stocks have grown between 20 and 60 percent larger than they were in 1981 and some will double by 1987.

Are we buying the "right" Navy for the maritime strategy?

Because research and development projects span decades, and ships take many years to build, the makeup of our fleet cannot change radically with each administration. Instead, the fleet evolves over time with policy and technology. The fleet today reflects the wisdom of the deck plates, the labs, and lessons learned from our exercises. The size and design of our ships and weapons reflect the inputs of sailors in daily contact with Soviet VICTOR submarines, KIEV-Class carriers, and BEAR aircraft. The wisdom of common sense and the highest available technology are tremendous advantages, brought to the design of today's Navy and Marine Corps.

Of course, there are many kinds of ships not in the fleet today that could do very well. The British INVINCIBLE-Class vertical or short take-off and landing (VSTOL) carriers, for instance, are quite capable anti-submarine warfare ships. It would be nice to have some of them in the U.S. Navy. There are many attractive European frigate designs, and we could make good use of them. There are also diesel submarines in the navies of our friends that fulfill very effective roles.

If the taxpayers of our allies around the world were not buying these vessels, the burden would fall upon us. But happily, they are carrying a considerable share of the cost of naval defense and American taxpayers do not have to fund a Navy greater than about 600 ships.

Perhaps the oldest defense chestnut debated on op-ed pages and television talk shows is whether our aircraft carriers should be larger or smaller. There is no absolute answer to this question, but the evidence still seems overwhelmingly in favor of the NIMITZ-Class carrier of 90,000 tons as the optimum size and design for putting air capability at sea. The Soviets appear to agree with this analysis in building the largest possible carrier their facilities will permit.

We reject the simplistic argument of some, that smaller-simpler-cheaper is better. Our tremendous edge in technology is a permanent potential built into the nature of our culture and our economic system. We must build to this advantage, and not trade it away for cheaper, smaller, less capable ships and aircraft built in greater numbers, which is the forte of a totalitarian, centralized, GOSPLAN economy.

It would be a great mistake for us to adopt a defense strategy at sea--any more than on land--that attempts to match totalitarian regimes in sheer numbers of cheap reproducible items. Time and again the high tech solution --tied together with common sense--has proven to be the wisest investment, and by far the most advantageous one for the United States and its allies.

We are developing and building the "right" Navy. Although there are plenty of other kinds of ships we would like to have, and we could certainly use the larger Navy long advocated by the Joint Chiefs, we have stayed consistently with the 600-ship fleet goal because we are prepared to bet that our allies will continue to maintain modern, effective navies and air forces. We are prepared to accept the risk that our nation will make the right decisions to prevent losses of forces early in a conflict. and we think that that is a prudent risk to run in order to have an affordable Navy.

Can we afford the Navy this nation needs?

Some recent commentaries have suggested that we cannot afford to sustain, or properly man, a 600-ship Navy. They are in error. We are doing both and will do so in the future. We have now, under construction and fully funded, all of the ships necessary to attain a 600-ship Navy centered on 15 carrier battle groups, four battleship surface action groups, and 100 nuclear-powered attack submarines.

Our current and future budgets reflect the "sustaining rate" for the 600-ship Navy, an average of 20 ships a year in new construction. The actual number could be higher or lower in a given year, depending on the block obscolescence of various types of ships, and economies of scale exacted in any given year. With an average life of 30 years, 20 ships per year will sustain a permanent fleet of 600 ships.

This "good news" should not blind us to the requirements of the future. A steady 20-new-ships-a-year average will require three percent budget growth. A future of zero-growth budgets--or worse--would mean that we will be unable to sustain a 600-ship Navy--or a capable defense. We know from painful experience in the 1970s that the damage done by no-growth funding is far greater than the mere percentage budget loss would indicate. With zero-or negative-growth budgets, the industrial infrastructure vital to fleet construction and support shrinks dramatically. The result is a loss in competitive bidding and a return to sole-sourced monopolies. Rates of production must then be cut, individual unit costs increase dramatically, productivity falls, and, in the final accounting, the American taxpayer gets much less "bang for the buck." Even worse is the decline in the quality and morale of the people who man the fleet, as we saw in the late 1970s.

Is three percent real growth beyond our means? Throughout the past two decades, many commentators favoring a reduced defense effort have repeatedly predicted that the American people will not support sustained defense growth. That refrain is still put forward by some as a fact of life. While it may express their hopes, it is not supported by history. That view takes as its norm the flat or even declining figures of the immediate post-Vietnam War period. In fact, except for those years, post-World War II naval budgets maintained growth commensurate with our national economy. The middle and late Seventies, by contrast, are now being seen as an anomaly in U.S. history. It is not apparent that the American people wish to "restore" that aberrant pattern of declining numbers of ships, morale, and readiness.

A quarter of a century ago, on January 17, 1961, President Eisenhower delivered his farewell address to the American people. The speech, largely intended to warn the public against excessive and wasteful government spending, was to become the most quoted and remembered of any of his presidency. It was this speech that indelibly entered the term "military-industrial complex" in the lexicon of the American defense establishment. But also in that speech he said:

> "A vital element in keeping the peace is our military establishment. Our arms must be mighty, ready for instant action, so that no potential aggressor may be tempted to risk his own destruction."

Let us look at Defense budget trends since that speech:

	Federal Outlays as % of GNP	DOD Outlays as % of Federal Spending	DOD Outlays as % of GNP
1960	18.5	45.0	8.2
1985	24.8 (up 34%)	25.9 (down 43%)	6.2 (down 23%)

This shows that federal spending as a percentage of GNP has increased 34 percent since 1960. Thus, Eisenhower's fear of ever-increasing government expenditures has been realized. But that increase has not been fueled by defense spending, which as a percentage of total federal spending has dropped almost 43 percent. And, despite the Reagan Administration's military buildup, the percentage of GNP these outlays represent is 23 percent less than Eisenhower's last military budget (FY 1960).

What of the "military officer bloat" that some "reformers" continue to inveigh against, citing as usual Ike's "military-industrial complex unwarranted influence" paragraph? Consider this table:

	Overall DOD General/Flag Officer Strengths	Overall DOD General/Flag Ratio Per 10,000 Military	Overall DOD Officer Strengths	Overall DOD Enlisted-to-Officer Ratios
1961	1,254	5.0	315,000	6.9
1985	1,073	5.0	308,000	5.9

In 1985, the figures for each service were:

	General/Flag Officers	All Officers	Enlisted Personnel	General/Flag Officer-to-Enlisted Ratio	Officer-to-Enlisted Ratio
USAF	338	108,400	488,603	1:1766	1:4.5
USA	412	109,687	666,557	1:1618	1:6.08
USN	253	70,657	495,444	1:1958	1:7.01
USMC	65	20,175	177,850	1:2736	1:8.82
USN/ USMC combined	318	90,832	673,294	1:2117	1:7.413

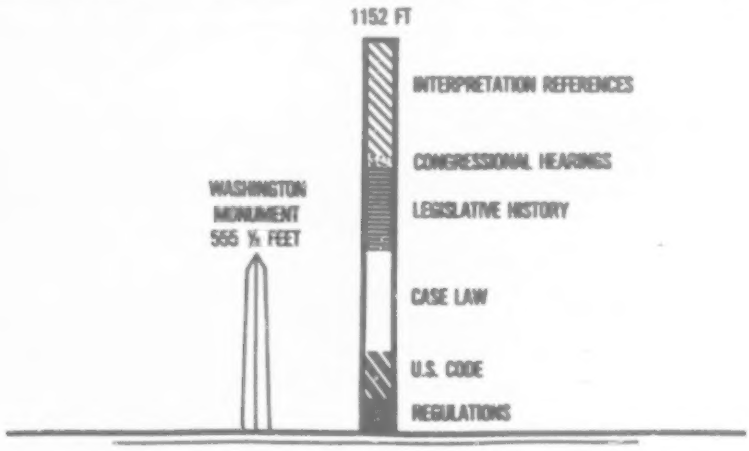
Once again, the facts do not support the "bloated gold braid" school of defense reform.

Shifting the focus to budgets and dollars, Eisenhower's last military budget, FY 1960, was $48.1 billion. Due to the ravages of inflation over 25 years, in 1986 dollars this amount swells to $213 billion. The Pentagon will have spent about $270 billion in 1986, an increase of 26 percent over Eisenhower's final military budget. This sounds like "considerable" growth until one considers that in FY 1986 dollars, 1960's GNP was $497.9 billion. Last year's GNP was almost 8 times larger, $3,890.1 billion. So despite the "record defense budgets" bantered about in the media, it is difficult once the facts are examined to conclude anything but the fact that defense spending has not kept pace with the growth in the national economy since 1960.

Still, Eisenhower's prophecies have been borne out. His admonishment to maintain balance among national programs has not been heeded. But, the much maligned military-industrial complex is not to blame for this imbalance. While Department of Defense (DOD) outlays as a percentage of GNP were dropping 23 percent in a quarter century, non-DOD outlays grew more than 80 percent. In Ike's last year, 55 percent of all Federal outlays were non-defense related. In 1985, 74 percent of Federal spending was non-defense related, an increase of more than 35 percent.

Also, since Eisenhower's time, legislative oversight has now become anarchy. How? Ten years ago four committees wrote legislation on Defense. Today 24 committees and 40 subcommittees oversee Defense. By actual measurement, current law and regulation on Defense procurement fill 1,152 linear feet of law library shelf space. Thousands of new pages are enacted yearly and almost none removed.

ACQUISITION LAWS AND REGULATIONS—1152 FEET OF LAW LIBRARY SHELF SPACE



Is the Defense establishment overgrown? Yes. To cope with this avalanche of legislation and regulation, each military department headquarters numbers 2,000, as does the Joint Staff and its appendages and the Office of the Secretary of Defense staff. There are 10 Defense agencies numbering 85,000, and nine joint and specified commands that each average nearly a thousand. No intelligent human being would pay $700 for a toilet cover. It took a unified buying agency of 50,000 billets to do that.

This vast bloat in Congress and the executive branch has all been done over the past 30 years in the name of reformation at the altar of the false idols of centralization and unification. It has completely "clericalized" the procurement process, destroying authority and accountability and creating an environment in which only monopoly, cost-plus and single-source contracting processes flourish in a natural state. Competition, discipline, austerity and accountability are forcefully opposed by statutory complexity, bureaucratic inertia and congressional resistance. All this despite a few steady voices in Congress who have for years tried to improve the process.

We need no new legislation; we need the repeal of hundreds of linear feet of existing statutes and regulations.

We need no new bureaucratic entities; we need a large reduction in the number and size of existing ones.

We need no more centralization and unification; we need more decentralization and accountablility through which the strong Secretary of Defense can unify all efforts to a central policy.

We need Congress to end the current chaos of subcommittees and reassert an orderly, strong role in meeting its constitutional responsibilities through a reasonable number of serious subcommittees.

In short, both Congress and the defense establishment must be de-organized to liberate the thousands of dedicated defense professionals in both institutions from their bureaucratic bondage and allow their common sense to prevail.

Management Initiatives

Those who look pessimistically at the costs of sustaining our Navy assume that just because this bloated, inefficient congressional-executive system has been in place for some 30 years that it will remain in place forever. I do not accept that. Moreover, under Secretary Weinberger's leadership we have shown in the Navy a historic reversal of the trend of inevitable cost increases.

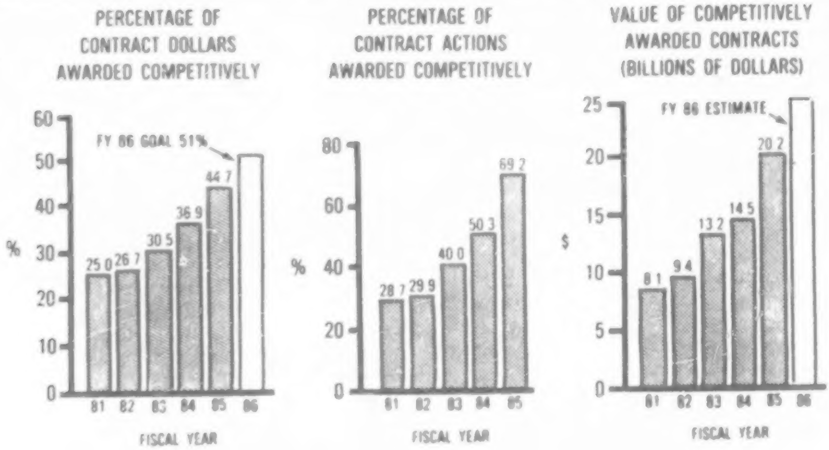
The remarkable progress achieved in five years in the naval recovery program is testimony to the success of the vigorous program of improved management and acquisition reform instituted by Secretary Weinberger. Five years ago he reversed a long and disastrous trend toward centralization and bureaucratization of management, with its attendant diffusion and destruction of line accountability. His leadership has brought about a new discipline and new accountability. Management authority has been returned to the Service Secretaries and they have been held accountable for achieving real reform in the development and procurement process. The Committee should take special note of the ten fundamental changes made in the management of the Department of the Navy:

- True competition. We have sought true competition, not merely the appearance of competition through source selection followed by decades of monopoly production. We have pursued a policy of establishing second sources in every appropriate program. We have raised the percentage of competition in our shipbuilding from 15.7 percent in 1980 to 85.6 percent in 1986, producing an average of $1 billion in cost underruns for each of the last four years. In 1985 we awarded $1.7 billion in competitive spare parts procurements, a 70 percent increase over FY 1984 and a 293 percent increase over FY 1982. Contracts for shipboard parts in 1985 were 12 percent lower on average than the previous year for the second year in a row.

In 1983 we established at flag rank a Competition Advocate General, the first such position within the Defense Department. He now has a network of more than 250 Competition Advocates throughout the Navy's acquisition commands.

In FY 1985 we awarded $20.2 billion competitively, or 45 percent of all Navy procurement dollars. That performance reflected $5.7 billion more than FY 1984 and $10.8 billion more than we awarded competitively in FY 1982. Over 69 percent of all individual contract actions executed in FY 1985 were competitive, versus 50 percent in FY 1984 and 30 percent in FY 1982.

DEPARTMENT OF THE NAVY PROCUREMENT COMPETITION PERFORMANCE



Contract savings from this new competitive approach in shipbuilding have been enormous. Today, for example, the last contract that we signed for a follow-on Aegis cruiser was $900 million. Four years ago, these cruisers cost more than $1.2 billion each, and were projected to reach $1.6 billion by the end of 1985. It did not happen, however, because we brought competition into the program. Both producing yards brought in new efficiencies and instituted strict cost discipline. The list goes on and on. As a result of these competitive savings, we were able to fund $410 million of the $467 million cost of the battleship MISSOURI (BB 63) at $430 million from contract savings and, in addition, were able to contribute $640 million from our overall shipbuilding savings to assist in funding the MX program.

We continue to look for innovative ways to foster competition. For example, private and public shipyards went head-to-head in an overhaul competition beginning last September. The first of its type, the competition is a test program to encourage cost savings and improve performance in both public and private shipyards.

-- Gold plating control. Without question, competition and fixed-price contracts are the formula for reducing costs in major procurement. But they can also be a formula for disaster, litigation, and claims, if a military service does not discipline its tendency to gold plate and to increase and change requirements during contract execution. We in the Navy have applied a new asceticism to our gold-plating lusts. Gold plating is now under firm control. An Air Characteristics Improvement Board and a Ship's Characteristics Improvement Board have now been established to control design and equipment changes in production of aircraft and ships. This has proved to be a very effective obstacle to gold plating and will carry into force our "Block Upgrade" policy. Under this policy, necessary changes and modernization in design are made only with new annual contracts and are priced and negotiated at that time rather than piecemeal in the middle of production runs. Very substantial savings have resulted from this procedure. No contract or engineering changes may be submitted for negotiation without the signature of the Commandant of the Marine Corps or the Chief of Naval Operations and the Secretary of the Navy.

- Program stability. You will note that the personnel readiness, shipbuilding, and aircraft procurement goals have not been changed in the five years since I first appeared before you. This stability is unprecedented in peacetime history, avoiding the ragged ups and mostly downs of previous five-year plans with the terrible costs and efficiency penalties that such uncertainty brings. Most of our aircraft programs have remained at stable long-term levels, and the multi-year procurement initiatives that we have been able to achieve in the C-2A aircraft and Ch-53E helicopter programs are saving taxpayers more than $190 million compared to their previously projected annual purchase prices.

- Contract discipline, accountability, and quality assurance. We have moved from a policy of treating cost-plus contracts as normal to treating them as being only acceptable as an absolute last resort for very high risk programs. Our policy now requires more equitable sharing between the government and its contractors, providing increased incentives for excellent performance and immediate contractor penalties for poor performance. We have put all of our aircraft procurement programs on firm-fixed-price type contracts and all of our ships on fixed-price incentive contracts, most with a 50/50 share line above and below the contract price. We have renegotiated contracts inherited from prior years to eliminate the more lenient terms on such programs as TOMAHAWK, TRIDENT, and the LOS ANGELES-Class submarine. We now provide our contractors with the opportunity to make more profit than heretofore allowable, by achieving performance that nets the taxpayer a substantially lower price. The corollary is that we require the contractor to bear immediately the cost of poor performance. Industry had responded at first with reluctance and now mild enthusiasm. After years of very late deliveries, cost overruns, and litigation of claims, all of our submarines are now on or under budget. The four most recent TRIDENT submarines were delivered to the Navy four to seven weeks early. THEODORE ROOSEVELT (CVN 71) was launched a year ago nearly 18 months ahead of schedule and more than $100 million under budget. The TRIDENT submarine ALASKA was just delivered three months early and $60 million under budget.

And we are moving to shift more facilitization and tooling start-up costs from government to industry. Defense contractors are getting fair profits as a percentage of sales, but measured as a return on assets they are grossly out of line. The reason is that until now Navy policy did not require investment in productive capital equipment and facilities for production of Navy work. Under our new policy, once production has been approved, contractors are expected to provide all production tooling and test equipment and the required facilities. Recovery of these investment costs will be through standard business practice -- depreciation and profit -- as negotiated between the Navy and the contractor.

- People. The people who manage our acquisition programs are critical to improving the way we do business. We must have experienced and highly skilled people performing program management and contracting functions to implement our acquisition strategy and cost-reduction initiatives.

Historically, Navy acquisition and procurement management has been plagued by rapid turnover of personnel, and inadequate experience and qualification in those assigned to those responsibilities. To correct these shortcomings, the most far reaching reform of naval officer career patterns undertaken in this century has now begun. A year ago we established the "Material Professional" career path. The first Material Professional screening boards met last year, and we now have over 900 officers, from commander to admiral, so designated. The career path of the Material Professional integrates sea tours with acquisition tours for an officer's entire career. Once an individual is selected to be a Material Professional, the warfare speciality is relegated to a secondary role. Approximately one-third of our flag officer billets have been set aside for Material Professionals. Now, pursuing a career in procurement and acquisition provides a path to promotion all the way to four stars that is as attractive as a line career.

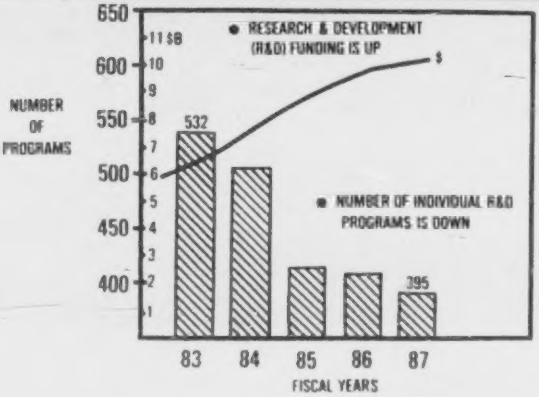
Establishment of the Material Professional's career path provides the education, experience, and most importantly, the career incentives required to make our acquisition managers capable, skilled business professionals with the warfare background necessary to properly manage weapons systems. No procurement or acquisition billet may now be filled by other than a Material Professional without a personal waiver from the Secretary of the Navy.

Our civilian Senior Executive Service (SES) is being reformed as well. Members of the SES are our top-level civilian managers. Many have responsibilities equal to those of chief executive officers (CEOs) and vice president of major industries. In order to give our SES members a better range of experience and to help them understand a wide variety of Navy programs and areas, we have mandated a five-year rotation plan. This plan is based on the private industry philosophy that, as an executive advances, he or she needs to understand--hands on--all aspects of a company's business.

Research and development (R&D) reform. We have stopped chasing R&D rainbows. In a major effort to make dramatic increases in the productivity of our R&D dollars and in substantially shortening the time from concept to delivery, fundamental changes have been made in R&D management. In 1981 we had more than 500 R&D programs. Today we have reduced that to 395, while increasing steadily the amount of funding placed in these programs. We have moved away from cost-plus contracts for full scale engineering development, and we now require the contractor to participate in risk sharing. We are no longer spreading too few dollars over too many programs where the payoffs in capability and efficiency are marginal. (See illustration next page.)

Beyond even this, we have pioneered a dramatic new concept in firm-fixed-price development of aircraft, where appropriate. This approach prevents both the errors of "total package procurement" and "cost-plus buy-ins". The first of these breakthrough initiatives were the fixed-price contracts for the complete redesign of the F-14D and the A-6F aircraft upgrade programs. Both of these aircraft will be entirely re-equipped with new engines, new avionics, new survivability features, new cockpits, and new radars, for a combined total R&D cost on a firm-fixed-price contract totaling less than half of the cost that it took to develop the F/A-18. The third example of this approach was the contract signed in 1984 with McDonnell Douglas and British Aerospace on a firm-fixed-price package of $438 million for the complete development of the T-45A Navy carrier jet trainer. This contract was brought in at about half of the budget estimate of $810 million.

DEPARTMENT OF THE NAVY
RESEARCH AND DEVELOPMENT REFORM
"STOP CHASING R & D RAINBOWS"



Achieving affordability through high technology. Emphasis in our research and development programs will continue to concentrate on achieving levels of high technology as a fundamental tool of American defense policy. We can never hope to match the numerical superiority of a totalitarian adversary such as the Soviet Union, but we can indeed maintain technological superiority to counter its advantage in numbers. The trendy arguments that cheaper and smaller are better are simply false. They have been invalidated time and time again in the Gulf of Sidra, Bekaa Valley, and the Falkland Islands. The results we are achieving now, with the F/A-18--for example--requiring less than half the maintenance man-hours per flight hour of the aircraft that it replaces, have enabled us to reduce our manpower requirements by some 50 personnel per squadron.

Similarly, our TICONDEROGA-Class AEGIS cruisers are each manned by only 300 enlisted men and 26 officers, roughly a third of the complement needed for the CHICAGO-Class they replace. The AEGIS ships are ~~also~~ many times more capable than their predecessors.

The current generation of high tech naval aircraft such as the F/A-18, F-14A, and A-6E now has a safety record more than twenty times better than the so-called low-cost fighters of 30 years ago.

Putting our own industrial house in order. We recognize the need to put industrial activities--shipyards, air rework facilities, public works centers, laboratories, and ordnance activities--within the Department of the Navy on a sound and efficient basis, when measured against like industry in either the public or the private sector. The Department has completed a year-long effort to design major cost-saving management reforms in its industrial activities. We have directed the implementation of initiatives in seven functional areas and expect to achieve as much as a 25 percent savings in operating costs, with greatly improved fleet support, over the next one to two years. Actions to streamline management and operations with the resultant efficiencies are currently underway in naval shipyards, public works centers, naval air rework facilities and weapons/ordnance activities, and will shortly commence in laboratories and data automation centers. We are planning no sweeping redesigns. We intend to go back to the basics of management and control. Our industrial operations can be managed through the use of many of the same techniques that are found in successful private companies. Major improvements will result from returning authority commensurate with their responsibilities to activity commanders; doing a better job of matching workforce with workload; and balancing costs and schedules. The reform of management of our naval industrial activities is currently our highest management priority and will remain so until firmly in place and anticipated efficiency savings are realized.

De-organizing and de-centralizing the Bureaucracy. The horrendous nature of the current over-layered system of defense management is well known. We need no new bureaucratic entities; rather, we need a large reduction in the number and size of existing ones.

Accordingly, this past year we disestablished one of our own chief offenders, the Naval Material Command (NAVMAT). This has decentralized acquisition management in the Navy and streamlined the decision-making process. NAVMAT headquarters authority has been distributed among five individual systems commands formerly under its control. Four hundred and fifty positions have been eliminated, improving accountability in program management. The systems commands themselves are being realigned. The Electronics Systems Command has been restructured to include space systems, ships systems and aircraft systems, and other service and allied systems in a new Space and Warfare Systems Command.

Also, we reorganized the Naval Education and Training Command last year, cutting its manning approximately in half. Functions were passed to subordinate commands to eliminate redundancies.

Cutting bureaucratic make-work. In related moves, we have drastically reduced the non-mission-related administrative workload imposed on the fleet. A recent Blue Ribbon Panel study determined that a bloat of bureaucratic burdens has been imposed on our operational units by headquarters staffs and Congressional reporting requirements. We were appalled to find that in operational squadrons, aviators were forced to spend an average of two-thirds of their time on non-mission-related paperwork. As a result of this study, we have reduced administrative-related reports and duties imposed by Department of the Navy directives by over 50 percent. We have also recommended to the Secretary of Defense that thirty-four of the over seventy reports required by Office of the Secretary of Defense (OSD) directives should be cancelled. Secretary Weinberger has indicated that he will review the list of reports and that action will be taken to cancel those that are unnecessary. In the case of those reports established by statute, he will seek Congressional relief. Secretary Weinberger also stated that the results of his review will be applied to the entire Department of Defense.

Management Initiative Results

The results of these management initiatives are quite dramatic. A few highlights are listed below:

- The disputes, litigation, claims, cost overruns, and schedule delays that characterized naval shipbuilding in the 1970s have been eliminated. Over the last four years (CY 1982-85), 78 ships have been delivered to the Navy of which 30 were ahead of schedule, 33 on schedule, and only 15 behind schedule. The net of all four years is 46 months ahead of schedule for all ships. After years of bitterness and massive cost overruns and claims in our submarine programs, all submarines have been delivered on or under budget. For the fifth straight year there has not been a single new construction contract shipbuilding claim outstanding against the Navy.

- Aircraft carriers. Our acquisition strategy for nuclear aircraft carriers has been very effective in reducing the cost of achieving airpower at sea and in accelerating the growth to a fifteen carrier battle group force level. Originally, a split buy of two new aircraft carriers in separate annual procurements for ABRAHAM LINCOLN (CVN 72) and GEORGE WASHINGTON (CVN 73) was estimated to cost $8024M. Our multiple ship award strategy in FY 1983 brought these costs down to $7270M, a savings of $754M. Furthermore, since contract award, sound management practices and the success of the Administration's national economic policies have achieved further cost savings of another $754M, bringing the estimated end cost to $6516M for the two CVNs. These savings permitted us to return $450M from the carrier account alone for reprogramming to the MX program. Escalation adjustment and shift of funds to other programs resulted in a further transfer of $54M from the carrier program.

In addition to saving over $1.5B by our CVN 72/73 acquisition strategy, we will also deliver these ships earlier than would have been achieved by the traditional split annual procurement approach. We estimate that CVN 72 and CVN 73 will each deliver 22 months earlier than would have been achieved by the traditional approach. Also, we expect THEODORE ROOSEVELT (CVN 71) to deliver by September 1986, at least 17 months earlier than the original schedule, through incentives we have established in the CVN 71 construction contract. Thus, a total of 61 additional nuclear aircraft carrier ship months will be achieved through our acquisition strategy.

- AEGIS cruisers. Bath Iron Works was selected as a second source to compete with Litton for procurement of AEGIS cruisers. Contracts were signed in December 1983 for the first three cruisers to be competitively awarded: two to Litton and one to Bath. The contracts resulted in a net constant dollar savings of more than $100 million compared to the previous year's sole source award of three ships to Litton. In November 1984, the second year of competition resulted in Bath winning two FY 85 ships and Litton one, with a net constant dollar savings of $97.7 million compared to the FY 1984 award. In December 1985, the third year of competition resulted again in Bath winning two FY86 ships and Litton one.

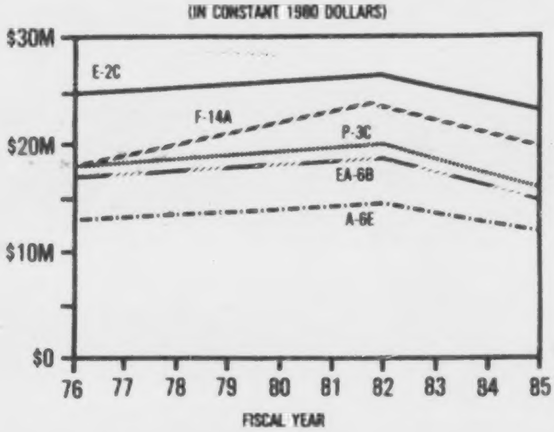
- Battleships. NEW JERSEY was recommissioned in December 1982 ahead of schedule and under budget. IOWA was delivered well ahead of schedule and under budget in April 1984 and is now deployed in the Caribbean. MISSOURI was in large part funded from contract savings and is currently ahead of its reactivation schedule in the Long Beach Naval Shipyard. Requests for proposals are out for WISCONSIN, fully funded by Congress in FY 1986. Award of a contract is anticipated in October 1986, with ship delivery in January 1989.

- Build/Convert and Charter Programs. Thirteen Maritime Pre-positioning Ships (MPS) and five T-5 tankers have been contracted for and are under conversion and construction. Eleven MPS have delivered; the final two deliver this year. Three of the T-5s have been delivered; the final two deliver this year. These ships provide a dramatic new capability to preposition the equipment and supplies to support three Marine Amphibious Brigades in areas of potential crisis around the world. The first six of the MPS ships were completed two months ahead of original schedule and under budget.

- Aircraft Unit Costs. The fly-away cost of the F/A-18 HORNET has declined almost 17 percent during the past three years, from $22.5 million per plane to $18.7 million in 1985, a savings of 16.9 percent. In terms of FY-82 dollars, we are paying a price 32 percent below the rate paid in FY-82. This is part of a sea change, an overall downward trend of major Navy aircraft prices during the 1980s, a break with 30 years of uninterrupted cost escalation in naval aircraft procurement. (See illustration next page.)

- Contract Manning. In the major Reagan Administration effort to reinvigorate the maritime industry and the merchant mariner profession, a total of 16 more ships, including cable ships, missile range ships, and fleet tugs, will be offered for contract manning in FY 1986 and 1987. This will raise to 40 the total of naval ships offered for contract manning added by this Administration. This has resulted in a cost reduction of nearly 40 percent.

U.S. NAVY
AIRCRAFT UNIT COST TREND 1976-1985



- Small Business. The Navy Department (from FY 1982 to FY 1985) increased by 55 percent in dollar value its awards to small businesses, including women-owned and minority-owned concerns. These contracts to small business totaled $7.046 billion in FY 1985, reflecting a new commitment to bring the benefits of competition and the small business industrial base to Navy procurement.

- Navy Acquisition Reporting System. This new system has been a dramatic success. It involves a new, simple, and straight-forward acquisition reporting system for the top 60 programs. It requires quarterly reports on any changes of estimated cost for R&D or production or changes in schedule for each of those 60 programs and provides early warning of performance difficulties. While this system is primarily meant for senior Navy management, its effectiveness makes it a prime candidate for eventual replacement of the current Selective Acquisition Reporting System.

- Assignment policy for Program Managers and Industrial Facilities Commands. The minimum tour length for officers serving in these important acquisition billets has been lengthened to four years. Arrival and departure from these assignments now is planned to coincide with major Department of the Navy Systems Acquisition Review Council (DNSARC) milestones and/or program starts or completions. Provision of guidance to promotion boards has been modified to increase emphasis on the performance of officers in acquisition management billets.

- BOSS. The Department of the Navy instituted in 1983 a spare parts procurement program called "Buy Our Spares Smart" (BOSS). It is particularly frustrating to us to find that the abuses and overcharging uncovered by the Navy itself over the past three years--items for which we recovered monies--are being used by headline-hunting critics seeking to discredit the very effort itself. Working with suppliers and parts contractors, we have made great progress in finding abuses, receiving refunds, challenging sole-source relationships, locating alternative sources, and reducing barriers to competition for spare parts by identifying and eliminating proprietary-data requirements. There are more than 2.3 million inventory items in the Navy's spare parts supply system (over 65 percent are controlled by the Defense Logistics Agency). We are methodically reexamining the more than 600,000 under Navy control--over 100,000 of them during this past year.

Return on investment in BOSS is considerable. During 1984-1985, the Navy invested $101 million in BOSS resources and achieved cost avoidance exceeding $520 million.

In 1983, 13.5 percent of our spare parts were procured competitively. In 1985 the figure was 33.8 percent. We are competing more buys to achieve more reasonable pricing. Where competing the buy is inefficient, we are exercising proper management techniques to control prices. A 1983 audit showed 35 percent of our non-competitively procured spares to be overpriced. By 1985 that had been reduced to 18 percent, and the trend continues downward.

- Depot Level Repairable (DLR) Components. In a major innovation in the management of maintenance funding, we have instituted a decentralization of the management of DLR components to the ship and the air station level. From 1981 to 1984 we tested financing the procurement and repair of non-aviation DLRs through the Navy Stock Fund. This improved material availability by 38 percent, reduced casualty response time by 26 percent, and increased the carcass return rate by 36 percent. We then began testing financing procurement and repair of aviation DLRs through the Stock Fund in April 1985. These initiatives establish a buyer/seller relationship between the Stock Fund and its customers who in turn are being held accountable for their expenditures. This should bring a much more frugal approach to ordering, based on truly needy, and an incentive to repair at the lowest authorized level and not waste repairable assets which can be turned in for credit.

Our management and acquisition reforms are not intended to impact the system for a few brief years only and then be buried under the weight of bureaucratic inertia and free-spending reaction. They are clearly being institutionalized into the very fabric of Navy life. In November 1985 I signed out an acquisition policy instruction codifying our acquisition reforms and ensuring their institutionalization at all levels of the Department of the Navy.

DEPARTMENT OF THE NAVY BUDGET FOR FY 1987

The Source of the Navy/Marine Corps Budget

Commentators with little knowledge of defense policy have criticized the service budget requests as exercises in simply asking for more programs that have a momentum of their own. Nothing could be further from the truth. The preparation of the 1987 budget began with the foundation of national strategy and the maritime objectives assigned to the Navy and Marine Corps. From maritime strategy came the force structure planning requirement. Throughout the year, the strategy and the force levels have been refined and tested in multi-national exercises, simulations, and wargaming. The most important input to the preparation of this budget are the assessments of the operational and theater commanders in their net assessments and recommendations for funding priorities. The lessons learned from real-world operations and conflicts such as the Falklands and the Middle East are applied and often further modify the budget planning. From the start of the FY 1987 programming process in September 1984, the application of common sense in placing priority on the "Strategy Areas of Concern" has been applied throughout. Then after exhaustive scrubbing and debate within the Department of Defense and with other agencies of the government, the Department of the Navy budget request has been completed.

Readiness

Personnel Readiness. The FY 1987 budget continues to place personnel readiness at the top of spending priorities as in the previous five budgets. Nothing is more important than our personnel. The tremendous turn-around in morale and personnel quality and performance has proved to the skeptics that, for the Navy and Marine Corps, an All-Volunteer Force produces a better and readier force for the long term than a peacetime draft. This success, however, depends on the maintenance of adequate compensation and adequate quality of life. We must maintain budgetary support for those priorities. Our budget request contains the following priority programs:

- Even with the 3% pay raise on 1 October 1985, our uniformed people are still behind civilian wage growth by 8.3%. The FY 87 four percent increase requested 1 October 1986 parallels the projected OMB FY 87 civilian wage growth. This is the absolute minimum we need to stay even and not widen the gap even further.

- Sea-duty enhancement programs. Naval service can be arduous, dangerous, and dramatically ill-paid when compared to civilian careers requiring comparable skills. We have been able to bring this into better balance through our sea pay, submarine pay, and special pays. These are continued and adjusted upward in the current budget. We have new initiatives, of particular interest, to correct the injustice currently imposed in reimbursement of travel expenses, by increasing certain reimbursements and weight allowances.

- Increases in End-Strength. We will continue to add about 20 ships per year to the fleet from now until 1989. We must have increased end strength to man these ships and our larger numbers of aircraft and support units. Because of Congressionally imposed reductions in the last four years, our end strength increase has not matched the requirements of the ships that have been added. The shortfall has been imposed on the shore establishment and that expediency can no longer absorb further cuts. Our active force end strength must be raised in FY 1987 by 11,400 for the Navy and by 1,500 for the Marine Corps. Reserve force structure also needs expansion. We are requesting an increase of 13,100 Reserve average strength billets for the Navy and 900 for the Marine Corps.

- Aviation Officer Career Pay (AOCP). One of the most dramatically successful and cost effective compensation initiatives in Navy history has been the AOCP program. Retention of naval aviators almost doubled in the last five years of paying AOCP. Pilots and naval flight officers (NFOs) are currently being retained at the rate of 53 percent and 73 percent respectively. Since the inception of the program, 1008 additional aviators have remained on active duty as a direct result of AOCP. The resulting cost savings were $823 million, which would have otherwise been needed to train their replacements. Shortages remain, however, in nearly all pilot and NFO communities. (See illustration next page.)

In each successive year of this bonus, Congress has imposed restrictions and reductions. We have seen a significant drop in the pulling power of this bonus during the past year.

The smaller numbers and the shorter periods of eligibility have reduced the attractiveness of the bonus by an appreciable degree. We have seen a sudden spurt in resignations of pilots, and we believe the time to deal with this problem is right now before it reverses the positive trend of recent years. We will be proposing enhancement modifications to the Committee which should increase the attractiveness of the AOCP bonus and eliminate the current loss of entitlement to hazardous duty incentive pay and aviation career incentive pay. This remains the most critical compensation initiative we require.

NAVAL AVIATOR SHORTAGES

COMMUNITY		PROJECTED SHORTAGE OF MID GRADE OFFICERS
VAL/VFA	PILOT	-216
(LIGHT ATTACK)		
VF	PILOT	-112
(FIGHTER)	NFO	-11
VAM	PILOT	-95
(MEDIUM ATTACK)	NFO	-26
VAQ	PILOT	-39
(ELECTRONIC COUNTERMEASURES)	NFO	-42
VS	PILOT	-72
(CARRIER ASW)	NFO	+ 11
VAW	PILOT	-39
(CARRIER AEW)	NFO	-25
VQ	PILOT	-42
(ECM/COMM)	NFO	+ 30
HS	PILOT	-15
(CARRIER ASW)		
HSL	PILOT	-102
(LAMPS)		
VP	PILOT	-106
(MARITIME PATROL)	NFO	+ 40

NFO - NAVAL FLIGHT OFFICER

- Nuclear Officer Incentive Pay. Retention of our nuclear-trained officers has improved by about 10 percent over the past five years. Nevertheless, a 22 percent shortfall in experienced nuclear trained submarine and surface warfare officers remains. We expect the shortfall to decrease to 11 percent by 1990 with the enhancement of Nuclear Officer Incentive Pay that was authorized in FY-86. Because of our shortages, we are forced to use our exceptional lieutenants in lieutenant commander nuclear engineering billets. We recognize the significant responsibility entailed in these assignments by "spot promoting" them to lieutenant commander. For this reason, spot promotion authority is essential. The accession bonuses paid to officers entering the program have met with continued success. This year we achieved 83 percent of our accession goal. The provision of these pay incentives for nuclear trained officers must be continued if we are to achieve our goals of manning the nuclear-powered ships with adequate numbers of trained and experienced officers.

- Recruiting and Advertising. As the target population for recruiting grows smaller every year and the economy grows strong, recruiting becomes increasingly more challenging. We have found disturbing survey evidence that youth awareness of Navy and Marine Corps programs is declining steadily. Navy/Marine Corps advertising acts as a significant tool for recruiting and we are asking for increased funding for both recruiting and advertising.

Material Readiness. Next to personnel, material readiness has received the highest funding priority of all Navy accounts during the last five years, and is up more than 30% for ships and 40% for aircraft since 1981 (as measured by C1 and C2 ratings). As we move steadily to our 600-ship Navy in 1989, we have maintained funding for material readiness proportionate to the growth in ships and aircraft. The FY 1987 budget should continue to support that proportion and the steady improvement in overall readiness outlined earlier. We are requesting funding, for instance, for the ships' maintenance program to provide for the overhaul of 37 active and six Reserve ships. This is being done at considerably lower cost because of our shifting of overhaul contracting to a more competitive process based on fixed-price bids. It reflects also the carefully engineered extension of operating periods between overhauls for ships and aircraft, and the overhauling of selected systems during shorter regular maintenance availabilities.

The FY 1987 funding request for flight hours has actually decreased from the past through tighter management while maintaining our goal of 25 flight hours per month per air crew. This has been accomplished in spite of a 4% growth in total hours, due to the addition of 112 crews.

Ship steaming days (50.5 days per quarter for ships in forward deployed fleets; 29 days for other ships) are funded at the same rate as FY 1986, adjusted upward for the larger size of the fleet. This figure is based on the required steaming days to maintain readiness and training.

- Aviation support. Planned procurement of Aviation Spare Parts (AVCAL), Aircraft Armament Equipment (AAE), Aviation Weapon Support Equipment (AWSE), and Ground Support Equipment (GSE) is on track. Current funding provides for 90 days of AVCAL for 13 carriers in 1987, for 14 in 1988, and for 15 by 1989. GSE, AAE, and AWSE will achieve 100% carrier and shore station fill by 1988 through competition and procurement savings.

- Ammunition. A major reform of our procurement practices in munitions, emphasizing competition and dual sourcing, has made it possible now to have in hand the production rates necessary to reach our complete warfighting sustainability goals by 1991. That procurement rate is funded in the current budget. We intend to have second sources for virtually all requested surface-to-air and air-to-air missiles, ensuring that we will be able to sustain our steady buildup toward inventory requirements at the lowest possible cost. Full funding of our requests is essential if we are to maintain the efficiency and cost reductions we are now achieving through competition and production rates at optimum levels for lowest cost.

Shipbuilding

The FY 1987 budget requests 21 new-construction ships, three conversions and reactivations. In the FY 1987 budget we continue dealing largely with the modernization and maintenance of the 600-ship Navy in the '90s, rather than force-building to that number, already achieved during the last five years.

Aircraft Carriers. There are no aircraft carriers in the FY 1987 budget and no new-construction carriers are needed until the early 1990s. We intend to request long-lead funding in FY 1992 for a NIMITZ-Class replacement for MIDWAY. THEODORE ROOSEVELT was launched in October 1984 and will become the 14th deployable carrier in 1986. ABRAHAM LINCOLN will join the fleet in 1989 as the 15th deployable carrier, and GEORGE WASHINGTON will replace CORAL SEA in 1991.

Battleships. The fourth and final battleship, WISCONSIN, (BB 64), was fully funded for reactivation with FY 1986 appropriations.

TRIDENT Submarines. The FY 1987 budget contains funding for the 14th OHIO-Class submarine, which will have a TRIDENT II (D-5) missile configuration.

Attack Submarines. The FY 1987 budget contains funding for four LOS ANGELES-Class nuclear attack submarines. It is essential, now that we continue to have both Electric Boat and Newport News producing these submarines with great efficiency, that we take advantage of the capacity to produce the numbers required at substantial savings. We estimate that the difference between contracting for four of these submarines competitively and contracting for three competitively means a reduction in price of $40 million for each of the four boats.

AEGIS Cruisers. The FY 1987 budget contains funding for two TICONDEROGA-Class AEGIS cruisers, the 20th and 21st of the class. These ships will be competed for on a fixed-price basis for the fourth straight year between Bath Iron Works and Litton.

AEGIS Destroyers. The FY 1987 budget contains funding for three ARLEIGH BURKE-Class destroyers. The lead ship was appropriated in FY 1985, and we expect to begin competitive series production in two shipyards this fiscal year. These ships are not force-builders, but will replace existing DDG 2 and DDG 37 class destroyers on a one-for-one basis.

Amphibious Ships and Landing Craft. Five years ago we embarked on a program to expand our amphibious capability to meet the lift requirements of the assault echelon of one Marine Amphibious Force and one Marine Amphibious Brigade. That program is progressing very nicely. All of these ships will incorporate design features to operate the new generation of Marine Corps equipment such as the CH-53E, the MV-22 OSPREY (formerly the JVX), the AV-8B HARRIER, the LCAC, and the complete new suite of armor, artillery, and infantry equipment now entering the Marine Corps inventory.

LHD-1: The FY 1987 budget contains long lead funding for the third and fourth ships of the new WASP-Class convertible amphibious V-STOL carrier, to be built in FY 1988 and FY 1989 respectively.

LCAC: The FY 1987 budget requests no new Landing Craft Air Cushion (LCAC), initially produced by Bell Aerospace Textron. These craft are undergoing extensive operational tests and debugging. A second-source contractor--Lockheed--was selected, and competitive production by the two shipbuilders will continue with the FY 1986 SCN award. The outyears envision a 9-craft-per-year program. This is the most revolutionary enhancement of landing craft in Navy-Marine Corps Team history.

Mine Countermeasure Ships. The reconstitution of our mine warfare capability is now in full swing. For FY 1987 we are requesting authorization and funding for four CARDINAL-Class coastal minehunters. Bell Aerospace Textron of New Orleans won the competition for the production of this new class of ship, based on the revolutionary surface effect design. For FY 1988 we are requesting authorization for four more, plus three AVENGER-Class mine countermeasure ships, a program we have restructured in accordance with our new management initiatives.

Support Ships. The FY 1987 budget contains funding for one fast combat support ship (AOE), two more oilers (T-AO), three more ocean surveillance ships (T-AGOS), one oceanographic research ship (AGX), and jumbo conversion of an oiler (AO). These eight ships will be awarded through fixed-price competition.

Sealift and Maritime Pre-positioning. Our budgets for the last five years have included significantly more money for strategic sealift than all previous budgets going back to World War II put together. The FY 1987 budget sustains that momentum with funding requested for the conversion of two more auxiliary crane ships (T-ACS). We have now had much success with our program to grow the Ready Reserve Fleet from 32 to 85 ships, having recently purchased 13 barge and vehicle carriers for $206.7 million. We are expanding our objective to achieve 100 dry-cargo ships, plus additional bulk oil carriers. The final two Fast Sealift Ships deliver this year, completing the eight SL-7 ship upgrade to lift rapidly an entire army armored division.

Naval Aviation

This year marks the 75th anniversary of Naval Aviation. The FY 1987 budget request contains 271 new Navy and Marine aircraft. This will build to an active inventory of about 5,700 aircraft, with roughly a quarter of these operated by the Marine Corps. A 14th active air wing is planned for FY 1987, and our two reserve air wings are currently modernizing as part of our horizontal integration.

F-14 TOMCAT Fighter. We have been able to maintain the stability in the F-14A production rate that, along with disciplined management, has brought about actual cost reductions in the airplanes. The FY 1987 request for F-14A aircraft was reduced to 15 because of the delays in production associated with incorporating the F-110 engine in all FY 1986 and subsequent aircraft. In addition, the Navy will continue development of the F-14D, under the firm-fixed price contract signed last year. This airplane will include new engines, avionics, survivability features, and radar upgrades. First production of the F-14D is planned for 1988.

F/A-18 HORNET Strike Fighter. We are requesting 120 F/A-18 aircraft. Because of the success of competing this airplane against the F-14 and the A-6, and because of very good performance by the contractors, we have brought the price of the F/A-18 down significantly every year. This year we have increased production to a more economic rate. We are considering a multi-year contract for the FY 88-92 buy-out of the program and anticipate even greater savings. This aircraft has set records for reliability and maintainability and proven its operational viability across the spectrum of warfare.

A-6 INTRUDER All-Weather Attack Aircraft. The A-6E continues to prove that it is the best all-weather precision bomber in the world. Based on the inputs of the joint and fleet commanders-in-chief, we have had to increase the requirement for the numbers of A-6Es in carrier air wings. As a result, we have a significant current shortfall of A-6 aircraft which will grow worse in the years ahead. This problem continues to be exacerbated by A-6E wing fatigue life. While all A-6Es are meeting the design specification for wing life, it had been hoped that wing life could be extended as much as 100 percent. That is not possible. We have, therefore, competed and awarded a firm fixed price contract to design, produce, and install new wings on all A-6s which are warrantied for 8,800 hours.

Funding is included in this year's budget for the continuation of the firm-fixed-price contract signed last year for the development of a completely modernized A-6F. We have just signed "production-not-to-exceed" contracts which are also in this year's budget. This aircraft will incorporate the F-404 engines, avionics and survivability features of the F/A-18, and will include a new state-of-the-art dual-mode radar. First production of the A-6F begins in FY 1988.

AV-8B HARRIER. The U.S. Marine Corps AV-8B completed both phases of its operational evaluation last March with great success. It has proven to be far superior in every mission area to the aircraft it is replacing, the A-4M and the AV-8A. Two squadrons are now operational and have completed successful training deployments. The aircraft is demonstrating a very good readiness availability. The FY 1987 budget includes funding for 42 aircraft.

P-3C ORION. The FY 1987 budget includes funding for nine P-3C maritime patrol aircraft.

CH/MH-53E SUPER STALLION. Funding is requested for 14 CH/MH-53E heavy-lift helicopters in the second year of a four-year multi-year procurement that will save $102.9 million. Four of these aircraft will be HM-53Es, the minesweeping version.

SH-60B AND SH-60F SEAHAWK. The SH-60B SEAHAWK LAMPS III helicopter received approval in 1981 for full production. The FY 1987 budget contains funding for 17 of these aircraft, and for seven SH-60F helicopters as the initial procurement of a replacement for the carrier-based SH-3 SEA KING. The SH-60F is an austere modification of the SH-60B LAMPS III helicopter. It will satisfy carrier search and rescue requirements, and its dipping sonar will meet an urgent requirement in dealing with the close-in Soviet submarine threat.

SH-2F SEASPRITE. The FY 1987 budget contains funding for six SEASPRITE helicopters. This light-weight ASW helicopter provides valuable capabilities to those ships that will not be modified to operate the heavier LAMPS III helicopters, primarily KNOX and OLIVER HAZARD PERRY-Class frigates, and will modernize the Naval Reserve.

V-22 OSPREY. The FY 1987 budget contains funding for the continued development of the V-22, formerly known as JVX. The Department of the Navy is the lead service for development and production of the OSPREY for all the services. It will replace the aging CH-46Es and CH-53A/Ds in the Navy and Marine Corps' inventory. In addition, modifications of this aircraft will be applied to many other missions in all of the services. We are including from the inception of this program the establishment of two production lines to compete annual production buys in the future.

E-6A TACAMO. Funding is requested for three E-6A aircraft in FY 1987. The TACAMO mission, now performed by EC-130 aircraft, provides a command link between the SSBN force at sea and their commanders. Replacement of the EC-130 force with the E-6A, a Boeing 707 derivative, will begin in FY 1988.

Other Aircraft. The FY 1987 budget includes funding for the final nine C-2 aircraft. The C-2 contract has been an extremely successful multi-year contract, now yielding more than $100 million in cost savings.

Marine Corps Programs

Maritime Pre-positioning Ships (MPS) Brigade Equipment. Funding is requested in FY 1987 for the third MPS Brigade and to continue equipment maintenance, modernization, and exercise funding for the first and second MPS Brigades. The second MPS squadron has replaced the Marine Corps portion of the Near-Term Pre-positioning Force (NTPF) ships , and funding continues to be required to rework NTPF supplies and equipment prior to reassignment to the third MPS squadron, to Pre-positioned War Reserve Stocks (PWR), or to the filling of unit equipment deficiencies.

Norway Pre-positioning. The Marine Corps program for pre-positioning selected equipment and supplies in Norway allows a Marine Amphibious Brigade (MAB) to move from the United States to the critical Northern flank of NATO in days, with a minimum requirement for strategic lift.

M-198 Howitzer. The FY 1987 budget contains continued funding for the M-198 to complete replacement of our towed artillery pieces with a weapon of significantly greater range, reliability, maintainability, and lethality. Ninety-four are requested in FY 1987.

Infantry Weapons Programs. The FY 1987 budget contains continued funding for the fielding of new infantry weapons, including the M16A2 service rifle and the M249 Squad Automatic Weapon (SAW), capable of engaging targets out to 800 meters with the new NATO Standard 5.56 mm cartridge.

Assault Vehicle Launched Bridge. This program will eliminate critical shortfalls in our assault river crossing capability. Eight are requested in FY 1987.

Research, Development, Testing and Evaluation (RDT&E)

The FY 1987 request for RDT&E is 10.2 percent of the Navy's total request. It represents the accomplishment of the pledge made five years ago to streamline and reduce the number of R&D programs and increase the funding where there is high payoff. We have reduced from well over 500 RDT&E programs in FY 1981 to 395 in the FY 1987 budget. A significant proportion of the entire budget is devoted to programs currently in full-scale development, including the TRIDENT II (D-5) missile, the F-14D and A-6F, and

E-2C and aircraft upgrade programs. Also of significance are the continuation of the SSN-21 Combat System, the MK-50 advanced lightweight torpedo, and the MK-48 ADCAP Torpedo.

SEAWOLF (SSN-21): Continued R&D funds are required for this extremely important new submarine, designed to counter Soviet threats in the full range of expected missions far into the twenty-first century. SEAWOLF will be quieter, faster, deeper diving, more heavily armed, and more capable of under-ice operations then today's attack submarines. Authorization for the first ship is planned for 1989. A firm ceiling has been placed on the lead and follow on submarines of this class. On 10 December 1983 we approved the conceptual design and established a lead ship price at a firm ceiling of $1.6 billion in FY 85 dollars, and a firm ceiling of $1 billion for the fifth and follow on submarines. This was the successful approach used on DDG 51 and is being applied to all new ship classes.

Oceanography

Knowledge of the ocean environment is critical to tactical and strategic force employment. We are now at the threshold of a new era with the potential for offering explosive growth in our understanding of the ocean. We are taking advantage of this technological opportunity by:

(1) Reinvigorating the oceanography designator as an elite corps;

(2) Investing in more capable equipment , such as the Navy Remote Ocean Sensing System (NROSS), and in oceanographic research vessels;

(3) Establishing an Institute for Naval Oceanography to provide the means to integrate newly emerging data from satellites and other varied sources to that it can be readily disseminated to our fleet; and

(4) Increasing our educational commitment within the military and civilian oceanographic community.

We have raised substantially the number of graduate fellowships in ocean sciences for naval personnel, increased the number of academic chairs in oceanography, and strengthened the ocean sciences' technology base.

The first Secretary of the Navy Fellow in our new Master of Ocean Sciences Program was Ensign Kristine Holderied, the top Naval Academy graduate of the Class of 1984, now pursuing her studies at MIT and the Woods Hole Oceanographic Institution. The first holder of a Secretary of the Navy Research Chair in Oceanography is Dr. Robert Ballard of Woods Hole. Dr. Ballard and his team, with Navy funding, developed the ARGO/JASON Undersea Search and Exploration System that located the sunken wreck of the TITANIC last year. The TITANIC discovery was a spectacular demonstration of the ARGO submersible's capability.

Our FY 1987 commitment in the technology base has been increased by approximately 6 percent, to $122 million. The NROSS will allow us to acquire global ocean data for operational and research use by both the military and civilian sectors. Our revitalization of ocean research vessels started in FY 1985 with the procurement of two new deep-survey ships. Follow-on shipbuilding efforts are beginning this year. The Institute of Naval Oceanography will use a large-scale computer to closely link universities, research institutes and the Navy in assimilation and use of ocean data from all sources.

Command, Control, and Communications (C3)

Major investment to improve naval C3 is strongly emphasized in this budget. Anti-jam communications development and implementation is our primary thrust to achieve reliable, secure tactical communications in support of fleet operations.

In order to provide anti-jam communications to the fleet and to help achieve a common, multi-service Joint Tactical Information Distribution System (JTIDS) program, the Navy has decided to stop work on its contract for JTIDS terminal development and to restructure the FY 86-91 Navy JTIDS program to procure the Air Force TDMA terminal as soon as possible.

Space

With three-quarters of the Earth's surface covered by the seas, the Navy has always had a priority interest in the maritime dimension of space. Naval operations are increasingly dependent on space systems strategically, tactically, and in peacetime. Nearly 85 percent of all operational satellite system outputs provided to the Armed Forces are used by the Navy. The coordination of military service and civilian agency activities in space has been remarkably smooth and successful. The establishment of the Naval Space Command in 1983 and the Space and Naval Warfare Systems Command in 1985 has greatly improved the management focus of Navy efforts in space.

Reserve Programs

Five years ago the Department of the Navy undertook a major reorganization of Reserve components to move from a vertical to a horizontal relationship with the active forces. Essentially, that means that the Reserves must provide immediate augmentation to the active force in time of emergency across the entire spectrum of warfare. It means also that, in peacetime, we rely on selected reserves to provide real-time fleet support across their mission areas. To execute this common-sense policy, the Reserves must have equipment compatible with the active forces. For instance, instead of providing the Reserves only such equipment as becomes obsolete and is removed from the active force, there must be a spectrum of new and old equipment reflected in the Reserves parallel to and in the same proportion as that in the active force. We have taken fundamental steps to bring this about:

- Eleven modern OLIVER HAZARD PERRY and KNOX-Class frigates have been transferred to the Naval Reserve Force, with a total program of twenty-six frigates planned by 1990.

- The first Reserve squadron has now transitioned to the F/A-18 and and two other squadrons to the F-14A.

- Modern A-7E, E-2C, and SH-2F aircraft have or are being transferred or acquired for Reserve units this year, with other fleet aircraft to follow during the current five-year plan.

- Squadron augmentation flying units have been established and have been operating successfully with each active duty airwing, providing current-trained aviators and maintenance personnel for immediate augmentation to active duty squadrons.

The Naval Reserve contains several components which only exist in the Reserves: 100 percent of the Navy's U. S.-based logistics support squadrons; 100 percent of light-attack helicopter squadrons; 100 percent of our combat helicopter search and rescue capability; 100 percent of naval mobile inshore/undersea warfare units--the "Brown-Water Navy"--structured for combat on inland waterways. Upon mobilization, the Reserves provide 99 percent of naval control of shipping organization manning for merchant ship mobilization and convoy formation for overseas operations; 86 percent of our ocean going minesweepers; 86 percent of the cargo-handling battalions vital to port management and loading operations in combat theaters; 85 percent of Military Sealift Command military personnel; 68 percent of Naval Mobile Construction Battalions, the famed Seabees; 66 percent of Special Boat Forces; 35 percent of maritime anti-submarine warfare patrol aircraft squadrons; 34 percent of naval intelligence personnel; 21 percent of ASW helicopter squadrons needed for fleet and convoy anti-submarine defense efforts; and 14 percent of our tactical sea-based aviation capabilities.

The Marine Corps relies heavily on a fully trained and capable Reserve component to complement its active force. Upon mobilization, this reserve component provides up to 33% of the Marine Corps' wartime manpower requirements. The Reserves provide 40 percent of Marine tanks; 33 percent of the heavy artillery; 30 percent of the light attack aircraft; and 33 percent of the anti-aircraft missile capability.

It is not often realized how fully integrated our Navy and Marine Corps Reserves are becoming in our active force structure and peacetime operations. Naval Reserve C-9 transport aircraft made many trips in support of our Marines ashore in Beirut during 1983 and 1984, and provided direct support to our operations in Grenada during the same period. The Ready Reserve provided 349 volunteers for three-week tours of duty aboard the battleship NEW JERSEY during its 11-month 1984 deployment, enabling most of the crew to rotate home for leave. And for the last two years aviation squadrons aboard deployed carriers have been augmented by reservists from squadron augment units (SAUs) on voluntary temporary active duty.

A most successful new initiative begun in 1983 was the Sea/Air Mariner program that now provides 10,000 first-term enlistments per year directly into the Naval Reserve. In FY 1985 a similar program for junior officer accessions directly into the Reserves was initiated in the Navy.

The newly begun Sea/College program will target the high-quality youth market for active naval service to broaden the quality base of enlisted personnel, attract high quality recruits for non-technical ratings and provide a stable input of fleet experienced general detail non-rated enlisted personnel (GENDETS) to the Ready Reserve.

CONCLUSION

The progress outlined above and the programs proposed for the future should be a source of much pride to this Committee and to Congress as a whole. It is strong testimony to the proposition that Congress and the Executive Branch not only can work together, they can achieve dramatic results in a very short period of time. In five short years we have made a real change in the global maritime balance. We have increased available ship days 40 percent for submarines and 20 percent for surface combatants. No longer do we have a one-and-a-half-ocean Navy for a three-ocean commitment; no longer do we have ships that cannot deploy on time for lack of trained sailors; no longer do we have a hemorrhage of talent from our career forces; no longer do we have an unending spiral of cost overruns and escalations; no longer does the world perceive the United States as a declining world power. The modest 5.6 percent average increase in the Navy/Marine Corps budget for the last five years has paid enormous dividends and provided capabilities many times more than that increment.

As you consider the dilemma of deficit reduction, the Eisenhower Farewell Address that I cited earlier seems particularly relevant, if it is considered in its entirety. The "unwarranted influence" of the "Military-Industrial Complex" will remain forever the legacy of this speech, but in its opening paragraphs, the only professional soldier to reach our nation's highest office in the twentieth century set forth the challenges he saw for America in the future:

> "We face a hostile ideology--global in scope, atheistic in character, ruthless in purpose, and insidious in method. Unhappily, the danger it poses promises to be of indefinite duration. To meet it successfully, there is called for, not so much the emotional and transitory sacrifices of crisis, but rather those which enable us to carry forward steadily, surely, without complaint the burdens of a prolonged and complex struggle--with liberty the stake."

To "carry forward steadily, surely, and without complaint, the burdens of a prolonged and complex struggle..." should be the watchwords of our nation's leadership. We in the Department of the Navy have every confidence that the Congress will demonstrate the constancy of purpose required to ensure the continued strength of our Navy and Marine Corps in a complex and frequently hostile world.

BIOGRAPHY
JOHN F. LEHMAN, JR.
SECRETARY OF THE NAVY

On January 23, 1981, President Reagan announced the selection of John F. Lehman, Jr. to be Secretary of the Navy. He was confirmed by the Senate on January 29 and took the oath of office on February 5, becoming the 65th Secretary of the Navy.

Prior to this appointment, Dr. Lehman was president of Abington Corporation.

He began his career in defense and foreign affairs as a staff member of the Foreign Policy Research Institute from 1967 to 1969 at the University of Pennsylvania. From 1969 to 1974, he served as special counsel and senior staff member to Dr. Henry Kissinger on the National Security Council and from 1974 to 1975 was a delegate to the Mutual Balanced Force Reduction Negotiations in Vienna. He became Deputy Director of the U.S. Arms Control and Disarmament Agency in 1975, holding that position until 1977.

Upon graduating from the La Salle College High School, Lehman enrolled in St. Joseph's College, where he earned a B.S. in international relations in 1964. After four years in Air Force ROTC, Lehman served three years in the Air Force Reserve while continuing his education at Cambridge University in England. He graduated from Cambridge in 1967, receiving a B.A. with honors law and an M.A. in international law and diplomacy.

He left the Air Force Reserve and accepted a direct appointment to the rank of ensign in the Naval Reserve in January 1968. Subsequently, he was designated a naval flight officer (bombardier-navigator) and then pilot, and he has been promoted successively to his current rank of commander. He is assigned to Medium Attack Wing One, Naval Air Station, Oceana, Virginia.

In 1974 he earned his Ph.D. in international relations from the

University of Pennsylvania. He has been a visiting fellow at Johns Hopkins School of Advanced International Studies and a Chubb Fellow at Yale.

Lehman has authored or co-authored several publications on national and international defense and foreign affairs subjects. They include: The Prospects for Arms Control, Ed. by J.E. Dougherty and J.F. Lehman, Jr. (McFadden: New York, 1965); Arms Control for the Late Sixties, Ed. by J.E. Dougherty and J.F. Lehman, Jr. (Van Nostrand: Princeton, 1967); The Executive, Congress and Foreign Policy, by John Lehman (Praeger: New York, 1976); Aircraft Carriers: The Real Choices, by John Lehman (Sage: 1978); and Beyond the SALT II Failure, by John Lehman and Seymour Weiss (Praeger: New York, 1981)

He was born on September 14, 1942, in Philadelphia, Pennsylvania and is married to the former Barbara Wieland. They have three children: Alexandra, 9; John F. III, 6; and Grace Virginia, 2. They reside in McLean, Virginia.

CHIEF OF NAVAL OPERATIONS

STATEMENT OF ADMIRAL WATKINS

MARITIME STRATEGY

Senator STEVENS. Admiral.

Admiral WATKINS. Thank you, Mr. Chairman.

This is my fourth and final year testifying as Chief of Naval Operations. Each year I have outlined our progress in developing a maritime strategy that is in agreement with and supportive of national strategy, Secretary of Defense Guidance, Unified Commander war plans, and is one that makes sense within the fiscal realities today.

We think we have a strategy that does all these things and more. We briefed many of the congressional committees on the maritime strategy, so I won't go into repetitive details today. It is important for me to reiterate that the progammatic fiscal decisions reflected in the Navy budget are derived from a straightforward logical process that does support national strategy.

MARITIME STRATEGIC ELEMENT

In our present fiscal environment there is an urgent need for a sound standard to assess the validity of our budget decision. In the Navy that standard is the maritime strategic element of the national strategy. Quite simply, if the program does not contribute to the execution of that strategy, we do not want it, no matter how fast or how high it flies or how good it looks, or what a good deal we can get by buying it. If you weigh testimony on our budget submission, I would hope you would consider in doing that the standard that we have set for ourselves and keep that in mind. We believe all our subsequent witnesses will clearly be able to support their contribution to the maritime strategy within that context.

GROWTH IN DEFENSE BUDGETS

Since he has been in office, the President has submitted sound defense budgets and the Congress has in the main approved them. They have permitted the growth in size and combat readiness and capability of the Navy. That growth was badly needed to restore the naval capability which had declined sigificantly over the last decade.

In 1981 our commitments around the world vastly exceeded our capacity to meet them. During the past 5 years your committee has appropriated funds for programs that permitted us to rebuild and to improve the Navy so that we now have the capacity almost for the first time in 25 years, to meet worldwide challenges with confidence, and, at the same with concomitant fairness to our sailors.

BUDGET REQUEST

The Navy budget request for fiscal 1987 builds on substantial accomplishments in the past 5 years and sustains these accomplishments into the 1990's. We request total obligational authority of $94 billion, Navy alone, which is carefully balanced among the four pillars of readiness, sustainability, modernization, and force structure. It is submitted with a conviction that the integration and synergism of these four pillars results in the most efficient allocation of these resources and in the highest total capability.

READINESS BUDGET

Over half of our budget is readiness, principally manpower, operations, and support. One-third of that readiness budget, $17 billion, is devoted to our highest priority and the cornerstone of continued success, our military personnel. With your support, our personnel readiness has increased substantially from 1981 to 1985.

QUALITY OF PERSONNEL

Recruiting and retention goals have been met. Quality of personnel has never been higher. Still we have an urgent need for modest growth and end strength to support the growing fleet. We have asked for an 11,400 increase. Over 90 percent of those are to go in the gray hulls and the squadrons.

About 1,400 support personnel would be primarily for medical support and some training support. So, it is all teeth in that manpower request. In the long term it will be very important that we maintain this personnel posture and ensure that our readiness and sustainability levels are maintained. It will enable us to man the fleet to meet these commitments. I would urge your support of not only the 11,400 increase in active end strength, but the 11,000 increase in the average reserve end strength.

SUSTAINABILITY

About 8.5 percent of our 1987 budget request is for sustainability. Principally over $4.6 billion of the $6.1 billion is in weapons funding alone. It reflects the priority of the Unified Commanders to improve their stocks of ordnance and war reserve material. We have more than doubled the sustainability share of the Navy budget since 1980 and as a result, substantial numbers of weapons and sonobuoys have been delivered. I have given you certain graphs in the longer statement for the record to show the details.

MODERNIZATION

The modernization pillar will receive approximately 18 percent of our 1987 request. This pillar includes alterations to ships, aircraft, weapon systems and research and development. Our investment strategy in this pillar enables us to field programs that must keep pace with a variety of continuing threats we must also face in the foreseeable future.

I can assure you that Secretary Lehman and I review every one of those attempted gold trinkets for those programs. We have weeded them out in a strict program we have established to make sure we do not get the unwarranted cost growth that, prior to this particular administration, used to be par for the course.

FORCE STRUCTURE FUNDING

Force structure funding in the request includes $11 billion for construction, conversion, reactivation of ships and about the same amount for procurement of aircraft. Our request of about 19 percent of TOA in the force structure line represents the minimum necessary to sustain the balance of this 600-ship force into the 1990's and beyond.

We are seeking funds for the 14th Ohio class ballistic missile submarine, four Los Angeles attack submarines, as well as five AEGIS equipped surface combatants, consisting of two Ticonderoga class cruisers and three Arleigh Burke class destroyers. Funds for the lead ship of the fast combat support ship, AOE-6, are also in the budget.

APN BUDGET

The APN portion of the budget includes funds for 172 aircraft, including 120 F/A-18's to replace F-4's and A-7's, and the first seven SH-60F carrier-based ASW helicopters we have been seeking for many years. We will continue the hard-nosed acquisition initiative we have instituted that have reduced the costs to the taxpayer for all procurement of ships and aircraft, as well as weapons and spare parts.

Today we are presenting a balanced Navy budget request. It matches available funds to each account based on the potential of that account to contribute to accomplishment of the maritime strategy talked about earlier.

Thank you, Mr. Chairman. I stand ready to answer any questions.

Senator STEVENS. Thank you.

[The statement of Admiral Watkins follows:]

PREPARED STATEMENT OF ADM. JAMES D. WATKINS

CHIEF OF NAVAL OPERATIONS

(SUMMARY STATEMENT)

Mr. Chairman, I am pleased to present an overview of the Navy's budget request for Fiscal Year 1987. It is a budget which builds on the substantial accomplishments of the past five years, and sustains those accomplishments into the 1980s. Particularly important in this time of fiscal constraints, it is a sound and disciplined budget, built within a single frame of reference: the maritime strategy.

The details of this maritime strategy are by now well known. It is wholly derived from national strategy and provides the framework for the Navy's contribution to national security, from daily operations in this era of violent peace to employment in global conflict. It is a coalition strategy, relying on the contributions of our allies and sister Services in both peace and war, and it has been the principal implement we have used in moving the Navy toward a truly integrated approach to warfare.

The Navy budget you have before you is the product of a process which begins with consideration of this nation's fundamental national security objectives and then applies the derived maritime strategy as the overarching criterion for all program decisions. We begin budget development by assessing our warfighting capability in each mission area in light of agreed strategic objectives. These assessments are the bases for decisions about the adequacy of current and planned programs, decisions about where to put our money and where to cut when required. To ensure validity of these decisions, we continually test both strategy and resultant programs in analyses, simulations, wargames, and exercises. The result is a budget which reflects the strategy standard: if a program does not contribute to strategy, we don't want it -- no matter how fast or high it goes, how good it looks, or how good a deal we can get.

One measure of the Navy's performance in support of national and maritime strategy is in operational accomplishments at sea. In 1986, for example, we conducted 86 exercises with 55 nations and all of our sister Services, completed 91 SSBN deterrent patrols, made port visits in support of U.S. policy objectives in some 108 countries, and deployed ships and aircraft to every ocean and international sea around the globe. As in years past, we also continued to be this nation's principal instrument of crisis and contingency response, as evident in our actions in the ACHILLE LAURO hijacking and, more recently, in multiple-carrier operations in the Central Mediterranean.

Accomplishments in improving our total military capability are equally noteworthy. From 479 deployable battle force units in 1980, we have grown to 547 today, and you have approved the remaining ships necessary to reach the 600 ship goal by 1989. Concomitant with growth in force structure, we have extensively modernized the older elements of the force. As a result, some 75 percent of our ships and 31 percent of aircraft are either new or have received major modernization overhauls or reworks since 1980. Investment in sustainability has increased by 135 percent in real terms since 1980, and is reflected in the steady improvement in stocks of weapons and sonobuoys on hand or soon to be delivered. In some categories, weapons stocks have doubled from the dangerously low levels of 1980 and will double again by the end of the decade.

Perhaps the most apparent improvement has been in the complex of personnel and material logistic support elements that comprise the readiness pillar. Since 1980, the number of aircraft squadrons at the highest levels of logistic support readiness has tripled, and the number of ships has doubled. The pride and quality of our personnel remains at or near all time highs. We have reduced the petty officer shortfall from 22,000 in 1981 to less than 6,000 today, and reduced the number of undermanned ratings from a high of 62 in 1982 to 28 of a total of 102 today. Disciplinary problems are down dramatically, and our standards for retention have become higher.

These accomplishments are examples of progress over the past five years, and they have two principal causes. First, Congress has supported necessary growth in the Navy's size and capability. At a cost of less than 6 percent average annual real growth since 1980, we have obtained dramatic improvements in each of the four pillars of total capability, and have a Navy which is demonstrably ready to carry out the requirements of national and maritime strategy, as evident in daily operations around the globe.

Second, the Navy has spent wisely the funds entrusted to us. It is ironic that while the public has been treated to a succession of procurement "horror stories" that total less than one million dollars over two years, the Navy has undertaken ambitious initiatives which have returned to the Congress, for your reallocation, billions of dollars. For example, since 1981 we have more than doubled the percentage of total contracts awarded competitively, with significant results. Savings achieved through shipbuilding competition alone in FY-83 through FY-85 exceeded $2.5 billion, including $248 million in the LOS ANGELES class nuclear attack submarine program and $840 million in the TICONDEROGA class cruiser program. Cost savings in aircraft procurement have been effected through a complementary series of initiatives. Control of specification changes to existing contracts, extensive use of fixed price contracts, and other management reforms have helped reduce prices for high performance aircraft, reversing a 30 year trend of aircraft price increases of approximately 10 percent per year above inflation.

To sustain these accomplishments, and to ensure the Navy continues to be ready to support national strategy, the Navy FY-87 budget requests a Total Obligational Authority of $94 billion. This request is carefully balanced among the four pillars -- integrated logistic support readiness, sustainability, modernization, and force structure -- and reflects our conviction that total military capability reflects the integration and synergism of all four pillars taken together.

Just over half of our budget request is for "readiness" appropriations, principally MPN and OMN. Roughly one-third of that, about $18 billion, is devoted to military personnel. Even in the current fiscal environment, the Navy budget reflects the fact that personnel programs remain our highest priority and the cornerstone of continued success. I am particularly concerned with adequate funding to recruit required numbers and quality of personnel, to retain critically needed personnel, and to provide modest end-strength growth for a growing fleet that the national security requires.

We have met recruiting goals for six consecutive years, but trends are down and long-term indicators are disturbing. The primary population of young men from which we recruit is declining, and surveys show that this group's propensity to join the Navy is declining as well. The Navy budget includes funding for advertising programs, recruiting manpower, and other programs essential to overcome these trends. Retention in general has been excellent, but problems are emerging in critical areas. Special pays and benefits such as Aviation Officer Continuation Pay (AOCP) and Selective Reenlistment Bonuses target the most critical areas and are our most flexible compensation tools. We are also requesting a 2 percent increase in active military end strength to support the growing fleet. While you have funded the ships and aircraft needed to achieve a 600-ship Navy by 1989, personnel growth has not kept pace. Sea/shore rotation demands, unique to the Navy, require the addition of one shore billet for roughly every two billets added at sea. This prevents unduly long sea tours with their adverse effect on morale and retention. We have inadequately manned fleet support and shore activities to man the new ships and squadrons of the growing fleet, which has already led to longer sea tours for critical, sea-intensive ratings. We continue to seek ways to cope with inadequate end strength, and have made major efforts to ensure sea/shore rotation ratios are as efficient as possible - but we have cut shore manning as much as it can be cut.

Sustainability comprises funding for the Navy's staying power in conflict, principally ordnance and war reserve material. Because our strategy explicitly considers protracted conventional conflict, and because ordnance stocks for protracted conflict have consistently been at the top of the Unified CINCs' priority lists, sustainability has more than doubled its share of the Navy budget, from 4 percent in 1980 to 10 percent today, principally $6.3 billion in WPN funding. Results are now being seen in the substantial numbers of weapons and sonobuoys, appropriated in previous years, now being delivered. The current request continues this urgently needed recovery.

Modernization, approximately 17 percent of the FY-87 request, encompasses Research, Development, Test and Evaluation (RDT&E), and alterations to ships, aircraft, and weapons systems. Modernization funding has increased by some 80 percent since 1980, second only to sustainability in the rate of real growth. This emphasis reflects both actions needed to correct the fleet overhaul backlog of the 1970s, and new programs to keep pace with the growing capabilities of the threats we must face, both Soviet and non-Soviet. We are seeing a strong commitment to qualitative improvement in newer Soviet forces to complement their longstanding numerical superiority. New Soviet ships, aircraft, and submarines are technologically sophisticated and highly capable, due in large measure to the hemorrhage of Western technology. Non-Soviet threats, such as Libya and North Korea, have also shown steady qualitative equipment improvements.

At $10.6 billion, RDT&E accounts for well over half the modernization request. Major programs include the modernization of the seabased strategic deterrent, particularly development of the TRIDENT II/D-5 submarine-launched ballistic missile, toward a 1989 initial operational capability; continued development and testing of the V-22 OSPREY (formerly JVX) vertical/short takeoff and landing aircraft, toward a planned first buy in FY-89; and Aegis weapon system upgrades for the DDG-51 ARLEIGH BURKE class guided missile destroyer and TICONDEROGA class cruisers. A particularly critical program is the R&D effort supporting anti-submarine warfare, especially the development of a new attack submarine, the SEAWOLF class (SSN-21). R&D programs now underway will provide the SSN-21 with improved quieting and new sensors, a more effective and integrated combat system, greater firepower, and improved arctic warfare capability. I am confident that the SSN-21, coupled with other ASW initiatives, will again put us several years ahead of Soviet submarine capabilities.

Force structure funding in the FY-87 budget includes $11 billion for construction, conversion, and reactivation of ships (SCN), and approximately the same amount for procurement of aircraft (APN). Ships and aircraft are perhaps the most tangible indications of naval power, and force structure is the most visible budget component, although it accounts for only about 20 percent of TOA. This year's request represents the minimum necessary to modernize the 600-ship force which we will achieve in 1989 and to continue our efforts to achieve our other force structure goals for amphibious, mine warfare, support, and cruiser/destroyer forces in the 1990s. We are requesting a 14th OHIO class ballistic missile submarine, and four more LOS ANGELES class submarines to meet the goal of 100 attack submarines. The request also includes five Aegis-equipped surface combatants -- two TICONDEROGA class cruisers and three ARLEIGH BURKE class destroyers -- and funds for the lead ship of the AOE-6 Fast Combat Support Ship class. In FY-87, we request APN funds for 271 aircraft as we build toward an airwing structure needed for a balanced force. These include 120 F/A-18s to replace aging F-4s and A-7s, and the first seven SH-60F carrier-based ASW helicopters.

The Navy's budget for FY-87 represents my best appraisal of the direction we must travel to sustain recent accomplishments, support national policy and strategy, and maintain the maritime strength necessary for this island nation's survival. I recognize that we face many difficult issues in the months ahead, and am well aware of the pressures to reduce even further our budgets and outlays. It is obvious that budget decisions over the next several months will affect our forces and capabilities. But more importantly, they will affect our ability to support national and maritime strategy. I ask that you look closely at requirements which derive from strategy -- not only wartime requirements, but extensive peacetime operations in support of this nation's interests, and the resultant demands on the Navy to respond to crises an average of six times per year. If you apply the strategy standard, I believe you will conclude that this nation needs the 600 ship, modern, and balanced fleet, with sufficient levels of readiness and sustainability, manned by capable, trained people, that our budget supports. Thank you.

A REPORT BY ADMIRAL JAMES D. WATKINS,
UNITED STATES NAVY,
CHIEF OF NAVAL OPERATIONS, ON THE
POSTURE AND FISCAL YEAR 1987 BUDGET
OF THE UNITED STATES NAVY

Mr. Chairman and distinguished members of the Committee: For the past four years, I have been privileged to lead our Navy on a steady course of growth, rejuvenation and restoration. I have been able to inform you the Navy is increasingly ready to perform its duties, a fact many of you confirmed first-hand by observing the superb performance of our sailors at sea. In no small measure this success has been due to your support and to our partnership in defense matters.

We are at a critical point. National consensus on defense has fragmented amid concerns over the deficit, allegations of defense wastefulness and assertions that substantial defense expenditures have produced insubstantial results. Plans for modest growth are fragile in view of last year's no-growth appropriation and the impending prospect of automatic cuts in budget request and outlays. It is time to place in perspective accomplishments of the past few years and to take a long-term look at requirements of the future. Decisions made over the next several months will chart the course for the remainder of the decade and beyond. We should avoid the tendency toward analysis by anecdote, and instead establish a consistent benchmark to measure performance and determine requirements.

There is a single framework to measure Navy accomplishments, assess the adequacy of forces, and establish requirements. The framework is strategy -- national strategy in general, and its maritime component in particular. In my first report to you three years ago, I set forth the emerging outline of a maritime strategy which included a fresh review of linkages between national policy and military strategy. Subsequent development and application of maritime strategy has ensured that requests for resources match requirements and that fleet operations and training proceed from a common perspective toward logical goals. Maritime strategy has also provided a coherent foundation for explaining Navy's purposes and discussing our course with the Congress and other important audiences outside the Navy. Strategy has become the nucleus of our profession.

Therefore, I want to review the principal outlines of the maritime component of national strategy. I will assess the Navy's performance and describe our accomplishments measured against the strategy. I will discuss near-term requirements reflected in our budget submission, and describe how maritime strategy shapes this program. Finally, I would like to consider longer-term challenges and opportunities which will shape strategy as we approach the 21st century. At this critical point you need and deserve a clear standard to assess the Navy's progress and set our future course. If you measure us by the strategy standard, you will find our programs justified, supportable, and essential to protecting this nation's interests today and in the future.

MARITIME STRATEGY AND NAVAL OPERATIONS

My previous reports to you have traced development of our strategy for deterring or, if necessary, fighting the Soviets in a major war, as well as for supporting national objectives in a variety of more likely operations short of major war. It is important to review briefly the sources, characteristics and new directions of maritime strategy to place it in perspective.

Maritime strategy is founded on basic United States national security objectives which include preserving the United States as a free and sovereign nation; supporting the country's economic well-being; fostering an international order consistent with our interests; and protecting the United States, its allies, friends, and overseas interests from coercion or attack. Given the world wide scope of our interests and obligations, the realities of geopolitics, and the nature of American government and society, national military strategy has consistently focused on three interrelated elements:

o Deterrence: Demonstrating military capability and will to deter and, if necessary, fight any potential aggressor at the required level of conflict.

o Forward defense: Maintaining deployments and rapid response capabilities to protect U.S. interests and commitments world wide and counter threats far forward. Forward defense is not only an integral part of deterrence, but ensures that, if deterrence fails, the fight will be in the aggressor's backyard, not ours.

o Alliance solidarity: Recognizing that allies are essential to deterrence in peace and crises, and to coalition warfare if deterrence fails. Alliances contribute both to the requirement for forward defense and to our capability to sustain a forward posture.

While these elements of national strategy have remained constant, the world environment and threats to our interests have not. In the maritime arena, two factors have profound effects on our ability to sustain a world compatible with our interests. First, Soviet naval and military threats have become truly global. Second, rise of an era of violent peace has threatened international order and stability.

The Soviet Challenge and Maritime Strategy

Over the past two decades, the Soviets have developed a formidable and continually improving blue-water navy able to further Soviet interests and challenge U.S. interests world wide. Their navy, with impressive new capabilities, has demonstrated the ability to conduct large-scale operations far from their shores, as reflected in recent open-ocean exercises in the North Atlantic and North Pacific. The most salient features include:

o Global disposition. As an example of the rapid Soviet evolution from a defensive to an offensive global naval power, the Soviet Pacific Fleet more than doubled its operating days out of home waters since 1975, and its major surface combatants and submarines increased by more than 20 percent. It is now the largest of their four fleets, testimony to their recognition of the Asian region's growing importance and potential in the global scheme of things.

o Global reach. The Soviets are increasingly capable of sustained operations in distant areas. Recent fleet additions clearly reflect increased attention to range and endurance. Military airlift and sealift have grown significantly. Relationships with fellow Marxist states have given the Soviets access to air and naval facilities in key locations near vital sea lines of communications, including South Yemen, Ethiopia, Angola, and Vietnam, as well as their longstanding presence in Cuba. Most noteworthy, the Soviets have established their first fully developed overseas base at Cam Ranh Bay, Vietnam. It supports a sizeable contingent of ships, submarines, tactical and long-range aviation. Figure 1 indicates the disposition and reach of today's Soviet Navy.

o Evolving full-spectrum capability. The Soviet Navy is aggressively developing the range of warfare capabilities commensurate with its global posture. The Soviets not only have the world's largest submarine force, but have introduced 13 new classes of submarines since 1975, 3 in the last 2 years alone. By contrast, the U.S. has introduced only two new classes during the same period. New Soviet submarines incorporate fundamental improvements over previous classes, including quietness, and sensor and weapons capability. New surface ships mount modern, capable anti-air and anti-submarine warfare systems to complement the Soviet fleet's historically strong suit of anti-surface warfare. Soviet Naval Aviation also gained significant new capability with introduction of the BACKFIRE supersonic bomber in the mid-1970's, and will take another quantum step forward with completion of their first large-deck aircraft carrier late in this decade.

Substantial Soviet naval improvements represent a major change in the strategic environment over the last 10 or 15 years. The Soviet Union, a continental nation, has become a maritime power by choice and design. The United States, linked to our friends, allies, trading partners and other vital interests by vast ocean areas, is a maritime power by necessity. When the predominant land power can contest control of an expanding portion of the world's oceans, an island nation must be concerned. As President Reagan observed early in his administration, a strong navy is not a luxury but a requirement.

Maritime strategy has focused our efforts on a qualitatively different and much improved Soviet challenge. It has helped develop better forces and better concepts of application in order to sustain U.S. national security policy in a changing strategic environment. The strategy has evolved around several underlying principles:

o Maritime strategy is an essential component of national deterrent strategy. Deterrence requires not only visibly capable forces, but also thought and thorough preparation for how a war with the Soviets could begin, and how it would be fought. Deterring the Soviets requires convincing them that any war they start could be a long war fought on terms and in places not of their choosing.

o It addresses warfighting requirements, in particular requirements for defeating Soviet strategy in a protracted conventional war. Recognizing that the Unified and Specified Commanders actually fight wars, it does not purport to be a detailed war plan. Instead, it offers a global perspective to operational commanders and provides a foundation for advice to the National Command Authority.

o It is a global strategy dealing with a diverse global threat and recognizing the complex relationships among operational theaters. It emphasizes that deterrence is a global proposition, that efforts to control and contain local crises may have global implications, that any war with the Soviets would probably become global, and that we should cede no area to the Soviets by default. Global strategy does not imply that we would simultaneously fight in all theaters of operation at the same level of intensity. If war came, we would likely have to assign priorities and conduct sequential operations. But the problem is global, and as a result, our perspective must also be global.

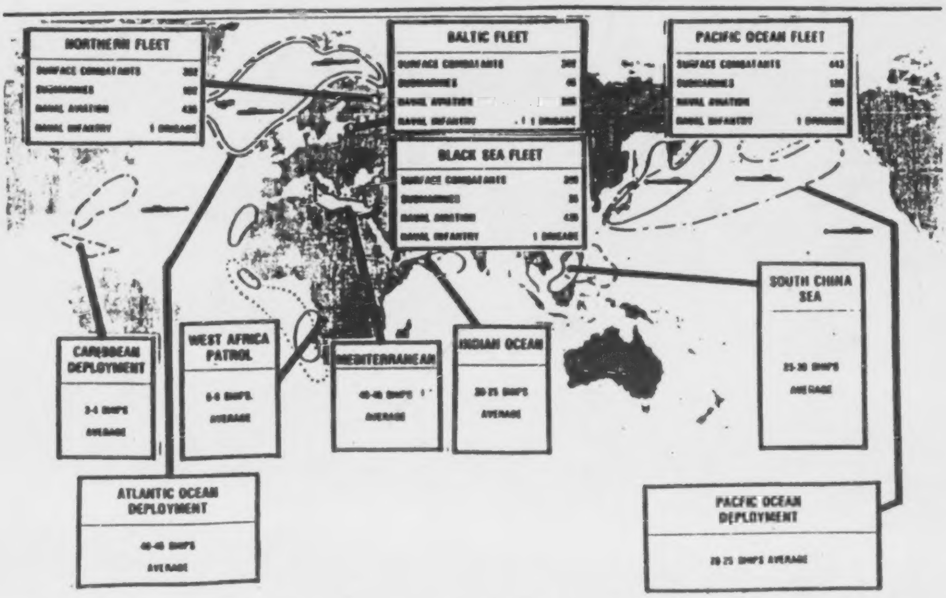
o It is a forward strategy, drawing on forward deployments and rapid mobility of naval forces. If deterrence fails, options are available for early offensive action to destroy enemy maritime forces as far forward as possible, aggressively protect sea lines of communications, support and influence land battles, and secure favorable war termination. It includes seizing the initiative and carrying the fight to the enemy to disrupt his strategy and achieve our objectives.

o It is a strategy of alliances and coalitions. It relies on our allies' major contributions to collective security, draws on agreed alliance strategy, and recognizes the crucial role of naval forces in binding together alliances and coalitions.

o It is a multi-service strategy which emphasizes the

Figure 1

SOVIET NAVY ACTIVE GLOBAL PEACETIME POSTURE
F.Y 85


NORTHERN FLEET
SURFACE COMBATANTS
SUBMARINES
NAVAL AVIATION
NAVAL INFANTRY
1 BRIGADE
BALTIC FLEET
SURFACE COMBATANTS
SUBMARINES
NAVAL AVIATION
NAVAL INFANTRY
1 BRIGADE
BLACK SEA FLEET
SURFACE COMBATANTS
SUBMARINES
NAVAL AVIATION
NAVAL INFANTRY
1 BRIGADE
PACIFIC OCEAN FLEET
SURFACE COMBATANTS
SUBMARINES
NAVAL AVIATION
NAVAL INFANTRY
1 DIVISION
SOUTH CHINA SEA
25-30 SHIPS
AVERAGE
CARIBBEAN DEPLOYMENT
AVERAGE
WEST AFRICA PATROL
AVERAGE
MEDITERRANEAN
AVERAGE
INDIAN OCEAN
20-25 SHIPS
AVERAGE
ATLANTIC OCEAN DEPLOYMENT
AVERAGE
PACIFIC OCEAN DEPLOYMENT
20-25 SHIPS AVERAGE

NOTE: Surface combatants include aircraft carriers; principal surface combatants; patrol, mine, and amphibious warfare ships and craft.

necessity of joint operations. Growing numbers of joint exercises, operations and inter-Service agreements reflect this emphasis.

o It is a flexible strategy, providing a set of global options which draw on the range of capabilities inherent in naval forces to control escalation and achieve war termination objectives without resorting to nuclear weapons.

The maritime component of the U.S. deterrent is stronger today than five years ago for many reasons. Naval forces are more modern and capable. They are more ready and sustainable. Our people are more experienced, better trained, and motivated. Finally our deterrent is stronger because of the coherent, well-articulated strategy which I have described.

Violent Peace and Maritime Strategy

While maritime strategy provides a consistent framework in which to assess changing requirements for global war with the Soviet Union, it increasingly must deal with requirements of another major change in the world environment: an era of violent peace. Some 100 years ago, Captain Alfred Thayer Mahan observed that naval strategy is as necessary in peace as it is in war. This truth has rarely been more evident: today, the Navy confronts issues of diversified violence below the threshold of war and faces a broad spectrum of possible threats.

The major powers are technically at peace, yet violence often dominates the international arena. In recent years we have seen a succession of crises and armed conflicts among nations, insurgencies and civil wars, endemic low-level violence, and countless instances of terrorism. Table 1 indicates the geographic scope and range of intensity of this violence. Much of this conflict occurs in the developing world, in locations far from our shores, yet important U.S. interests are often involved. Our Navy has been called on more than 200 times since World War II to protect American interests in crises around the world. We operate routinely on forward deployments often determined by potential threats to U.S. interests.

TABLE 1

REPRESENTATIVE CONFLICTS, 1985

Conflicts and Crises Between States

- *Gulf War (Iran-Iraq)
- *Indochina Conflict (Vietnam, Kampuchea, Laos, Thailand, China)
- *North Africa Crises (Libya-Tunisia and Libya-Egypt)
- Southern Africa (South Africa-Angola, South Africa-Lesotho)
- *Central American Crises (Nicaragua-Costa Rica, Nicaragua-Honduras)
- *Horn of Africa (Ethiopia-Somalia)
- *Afghanistan-Pakistan Tensions

Civil Wars and Insurgencies

- Afghanistan
- Ethiopia
- Sudan
- Mozambique
- Angola
- Namibia
- Western Sahara
- *Lebanon
- Chad
- *Philippines
- Indonesia
- Burma
- *Nicaragua
- *Guatemala
- *Colombia
- Peru
- Bolivia
- Uganda

Coups and Attempted Coups

- Liberia
- Nigeria
- *Thailand
- Uganda
- Sudan

Violent Civil Unrest

- *Sri Lanka
- India
- Chile
- South Africa
- New Caledonia
- Jamaica

Terrorist and Related Incidents

- *Lebanon
- Malta
- *Eastern Mediterranean Sea
- France
- Italy
- Austria
- *Libya
- Greece
- Spain
- West Germany
- Belgium
- Israel
- *Iran

*Naval forces present in region on forward deployment or contingency operations.

Conflicts have long been a fixture of the world environment, but recent developments increase the significance of these conflicts and create an expanding range of maritime objectives beyond being prepared to counter the Soviets in direct conflict. One factor is the complexity and scope of U.S. world wide interests, which increasingly focus on the developing world. U.S. and allied economies depend on strategic resources from the developing world: oil from the Persian Gulf and Caribbean, and minerals from Africa and southeast Asia. Trade with nations of the Pacific region has for several years exceeded that with Europe, and political cooperation in the region is also growing. Manufacturing capabilities are often integrally linked with Third World nations in the emerging "global factory"; for example, an American firm may ship Japanese semiconductors to Taiwan for assembly into circuit boards, which are then returned to the United States for assembly into a Navy weapons system.

These interests create vital stakes in the stability of many areas. In a general context, regional stability promotes trade, economic development, and democratic forms of government. In a more specifically military context, the more stable the regional environment, the lower the probability that the Soviets or any other aggressor will find opportunities or incentives to risk war. Moreover, because major war would most likely arise from some regional conflict, we have a broader interest in preventing regional conflicts from beginning an uncontrolled escalatory process.

Challenges to regional stability are numerous and longstanding: economic and political perturbations, religious and ethnic hostilities, border disputes, aggressive designs for hegemony. These are magnified by increased Soviet ability to exploit them to promote movements and governments aligned with them. In particular, Soviet use of Cuban and other proxy forces to aid "liberation" movements and sustain Marxist governments has fundamentally changed conflict in the Third World. These factors, combined with increased Soviet military and naval global reach, make it likely that the Third World will increasingly be the scene of both indirect and direct Soviet encroachment on U.S. interests.

Another trend making the world potentially more hazardous and complicating naval requirements is acquisition of modern, highly capable weapons by states or factions in the developing world. These make Third World conflicts more violent and dangerous and they increase the range and lethality of threats which U.S. naval forces may face. Nearly 50 Third World nations now operate modern anti-ship missile systems, and some 20 possess submarine forces of varying capabilities. While many of these nations are friends or treaty allies, many others are potentially hostile. The military threat in many Third World areas is formidable and highly demanding, particularly when complicated by Soviet intervention or support.

Terrorist threats pose another disturbing trend. Terrorism is not new, but the threat to our interests has increased markedly. Terrorists have international organizations, exploit mass communications and use rapid transportation. Increasingly, they are directly or indirectly sponsored by states which see a cheap but effective way of striking blows at stronger enemies. Terrorism's effects must be kept in perspective, but they clearly add to the challenges of maintaining forward deployed forces and protecting American interests.

Thus, a strategy to deal with violent peace is shaped by interests, objectives and world conditions which are not necessarily parts of a strategy to counter the Soviets in global war. Peacetime interests and objectives are global and diverse, focused not only on the Soviet Union or its periphery but also on the developing world. We face an extraordinary spectrum of threats, ranging from terrorism and low-level violence, through crises and small wars, to a major war. At the lower end, we must employ military forces to achieve political or foreign policy objectives. At the upper end, peacetime strategy merges into global war strategy, and the two must form an integrated whole. I will now discuss our evolving peacetime strategy, which comprises three principal elements: forward presence, crisis response, and training and readiness operations in home waters.

Forward presence. Global forward posture in peacetime is a key element of national military strategy. Naval forces are particularly crucial in many areas where they are the only feasible form of forward deployment. The impact of forward deployments is enhanced by a qualitatively improved fleet which is not only larger today than five years ago, but brings to bear quantum improvements in capabilities such as TICONDEROGA-class Aegis cruisers and OHIO-class Trident submarines. Roughly one-third of the operating Navy is deployed on any given day, conducting training and exercises with friendly and allied nations, making port visits, and carrying out a range of other operations. Forward operations signal the global scope of U.S. interests and commitments.

The nature and location of forward deployments result from decisions at many levels: specific alliance commitments, national policies, Navy requirements, and operational decisions by Unified and Navy commanders. In general, however, certain principal considerations form the framework:

o Forward deployments focus on locations where imminent threats to U.S. interests require an on-scene military capability. Requirements for crisis prevention and response define a substantial part of our deployments. For example, the Persian Gulf conflict and the unpredictability of the Iranian government pose a continual threat of violence against allied and friendly interests, particularly unfettered access to vital oil resources. Free world economies can ill afford any effective threat or actual curtailment of petroleum product flow to and from the region. Consequently, Navy surface combatants are constantly on patrol in the Persian Gulf, and a carrier battle group is routinely in or near the North Arabian Sea. In the Near East, U.S. interests and citizens remain at risk from a variety of sources, and U.S. naval presence includes surface combatants in the Eastern Mediterranean and a carrier available on short notice. Increasing seaward claims of some littoral nations, coupled to modern armaments with substantial seaward reach, pose a threat to essential maritime freedom of passage. An example is Libya's excessive territorial claims in the Central Mediterranean, backed by Libya's modern forces, recently escalated by deployment of an upgraded air defense system. The latter includes Soviet-supplied SA-5 surface-to-air missiles which will extend Libya's hostile reach 150 miles into Mediterranean airspace. Here and elsewhere, forward deployed naval forces conduct operations to protect transit rights and unimpeded use of international waters and airspace.

This past year, Navy units also participated in a major drug interdiction campaign, Operation Hat Trick II, a significant addition to existing commitments and normal presence operations which again showed the flexibility of naval forces in support of national objectives.

o Forward deployments are also shaped by the requirements for coalition-building. Alliances, friendships, and regional arrangements can contribute to international stability. All U.S. alliances have a major maritime dimension, and joint exercises, training, and security assistance programs are crucial. This past year, for example, we conducted 86 combined exercises involving some 55 countries, ranging from the 160-ship Exercise Ocean Safari with NATO allies, and an equally large-scale exercise with Pacific friends and allies, RIMPAC; to more modest efforts such as Cobra Gold, an amphibious exercise with Thailand; to small-scale exercises of opportunity with passing units of allied navies in virtually every ocean.

Many such exercises involve forces forward deployed for other purposes. But a substantial number of units deploy specifically to conduct important exercises. For 26 years, U.S. ships and aircraft have deployed annually to exercise with Western hemisphere navies in the UNITAS series. Every year, a sizeable number of units deploy to the North Atlantic to operate with NATO allies in large-scale exercises. These and similar deployments ensure interoperability and build strong ties essential for deterrence and effective warfighting should deterrence fail.

o Forward deployments include areas where naval forces promote diplomatic, economic, and other objectives of foreign policy not specifically military in character. Port visits have been particularly useful in this context. A sovereign nation permitting a U.S. warship to visit its ports is making a significant political statement, particularly in a time of new nonalignment trends. Within the past two years, Navy surface combatants made port visits to India, the first such visits in 13 years, thus symbolizing the recent evolution of U.S.-Indian relations. Last year, Navy ships visited some 108 countries ranging from Honduras and Guatemala to Denmark and Norway, from India and Sri Lanka to Fiji and Papua New Guinea. Port visits may support foreign policy objectives of promoting moderate and stable governments in unstable areas. They may also gain access to countries where other U.S. forces are excluded, providing crucial opportunities to improve bilateral relations, such as recent visits to Madagascar and the Comoros Islands in the Indian Ocean. Sailors are ambassadors and representatives of the American people in ports around the world, and have freely given their off-duty time and considerable skills to participate in self-help projects with the local populace, assist orphanages and other charitable institutions, and contribute to a variety of other endeavors which exemplify the American spirit of generosity.

o Forward deployments are also shaped by requirements for active and direct deterrence of a major war with the Soviets. Patrols by ballistic missile submarines constitute a fundamental component of the nation's strategic nuclear deterrent. Forward peacetime operations by our own attack submarines, maritime patrol aircraft, and surface ships make clear to the Soviets that should they choose to go to war, there are no maritime sanctuaries for them and their submarine force would be immediately at risk. Through these and other forward operations, we send a clear message to the Soviets that we have the capability and experience to carry out campaigns envisioned in the maritime strategy, and thereby deter global war for which we train.

o Forward deployments are driven to a lesser extent by Navy objectives for training and readiness. Forward deployed operations increase readiness, ensure real-world operational expertise, provide day-to-day preparedness and build our confidence. While Navy training and readiness objectives are clearly subordinate to national objectives, they are nonetheless important to maintaining a ready force.

These, then, are considerations which determine locations and composition of forward deployments for naval forces. Since they often overlap, one deployment may serve several objectives. They also compete. For example, forces deployed to provide direct deterrence of the Soviets tend to operate in the North Atlantic and North Pacific Oceans, and may contribute little to crisis prevention in the Third World. Ships deployed to prevent crises may be unable to make diplomatically-important port visits. Naval forces are a scarce resource which must be allocated among competing demands. But their inherent flexibility permits selective allocation.

Crisis response. Crisis response has long been the business of U.S. naval forces and is a central concern of our evolving strategy. Naval forces have been a principal instrument for responding to crises for several reasons:

o Naval forces are readily and rapidly available, largely because of the previously discussed forward posture keyed on likely crisis locations. A credible on-scene capability establishes U.S. commitment and intent to be involved, and forms the basis for a wide range of initial responses. Moreover, this capability is often available without politically sensitive requests for use of friendly nations' airspace or territory.

o Forward-deployed naval forces employed for crisis response are practiced in joint operations with allies and other U.S. military Services.

o Naval forces have unique flexibility and mobility. They can operate unobstrusively or quite visibly; apply a range of capabilities against targets at sea, along a littoral, or deep inland; and prevail against a variety of threats. For deterrence or response, naval forces provide precise capabilities at varying levels of hostility. These qualities permit the national leadership to tailor application of force to a particular crisis.

A key consideration in crises is our ability to dominate and control escalation, to ensure that we achieve specific objectives while limiting the scope of possible conflict and terminating military action as soon as possible. This issue is particularly important in crises which might involve the Soviet Union. Given the Soviet Navy's growth in capability and reach, their ability to intervene in crises far from their shores adds a new dimension to the strategic calculus of crisis response. While there have as yet been few direct confrontations between U.S. and Soviet naval forces, the potential increasingly exists, and must be considered in our decisions.

Thus, substantial interaction exists between forward presence and crisis response considerations. Forward presence shapes the range of options in crisis, at least initially, and crisis response sometimes leads to new forward deployments. Threats of an era of violent peace interact with the threat posed a capable Soviet forces. Our ability to respond to crises while controlling the escalation threat requires highly capable forces.

Training and readiness operations. On any given day, about two-thirds of the operating Navy is neither forward deployed nor responding to crises, but in home waters conducting underway training, or in port for upkeep and inport training. These operations are shaped largely by internal Navy objectives and requirements, but they can contribute to other peacetime strategy objectives and must be an explicit part of our strategy. For example, while it may not be feasible to conduct a multi-carrier battle group exercise in forward areas, such an exercise can readily be conducted in home waters. A large-scale exercise in home waters plays a powerful role in deterrence, conveying to the Soviets what we could do in forward areas. If such an exercise includes allied participation, it can serve alliance-building objectives as well.

Inport training exercises are increasingly important. Modern training technology permits us to conduct challenging, large-scale battle group exercises among units which are pierside. In Second Fleet homeports, for example, Battle Force Inport Training is scheduled regularly, exercises a full battle force, and is as close to a major fleet exercise as possible without actually getting underway. While such exercises cannot be as realistic as those at sea, they fully exercise command, control, and communications procedures, and support strategy objectives at minimal cost.

Nondeployed units are also the source of surge capability for large-scale crises or conflicts, when forward forces might need immediate augmentation. Demonstrating surge capability is an important component of deterrence and crisis control. During the Grenada rescue operation in 1983, for example, we assembled a surge battle group from inport units, formed around the carrier AMERICA, as a possible relief for the INDEPENDENCE battle group then off Grenada. The AMERICA battle group was underway on four days' notice, was fully operational three days later, and could have augmented or replaced INDEPENDENCE as required. On a more routine basis, we conduct short-notice sorties of fully-loaded attack submarines to demonstrate and practice surge capabilities.

Because resources are limited, it is essential that we obtain maximum strategic benefit from every underway day. There are clearly strategic objectives which we can pursue efficiently through nondeployed operations as well as forward deployments, and we will continue to incorporate home waters operations into overall peacetime strategy.

A Dynamic Strategy

These are the main themes of a maritime strategy designed to be in consonance with the national military strategy and sufficiently robust to permit us to continue to be an effective player across the spectrum of violence we face. It is a dynamic strategy, continually evolving in response to changes; maturing in view of insights gained in wargames, simulations, countless seminars and discussions; and leavened with the reality of fleet experience and exercises. It began as a strategy to address the central question of deterring or fighting a global war against the Soviets. Increasingly, however, it has evolved rapidly to encompass issues of diverse threats to our many interests in this era of violence.

Strategy is not immutable theology, nor is it a one-time fix to a static problem which we can now put behind us. It is a process which includes an ongoing dialogue on strategic issues both within the Navy and without. I consider this report an important part of that dialogue, and have thus addressed strategy at some length. Further I consider the development and maturation of maritime strategy within the Navy a most significant accomplishment in itself. There is virtually no direct dollar cost associated with strategy development and application. In fact, it helps reduce costs since it serves to focus our resources on operations which match agreed strategic force employment concepts. And application of strategy is affecting every aspect of today's Navy: we are, in fact, building a Navy to meet maritime strategy requirements.

If you measure us against this strategy, I believe you will find that evidence of our accomplishments is clear. We have a Navy ready today to support a national maritime strategy, and it is getting better each day.

Naval Operations in Support of Strategy

The most telling indicators of the Navy's performance in support of national and maritime strategy have been our operational accomplishments at sea. In 1985, naval forces operated to protect U.S. interests from a variety of threats, build alliances and regional stability, deter war, and support diplomacy. Unlike some previous years, 1985 saw few crises requiring U.S. forces.

But when crises affecting U.S. interests did occur, as in the ACHILLE LAURO hijacking, naval forces were on station and ready when needed.

A case study in flexibility, mobility, and utility of naval forces in support of national strategy is the deployment of the aircraft carrier SARATOGA and her battle group. Last August, SARATOGA left her homeport of Mayport, Florida, to participate in Exercise Ocean Safari 85, a major NATO operation exercising our capability to control the North Atlantic and secure vital sea lines of communication in time of war. It was the largest NATO maritime exercise ever held, involving some 160 ships. The exercise began with a convoy exercise departing Boston harbor, coordinated by the Commander, U.S. Maritime Defense Zone Atlantic, a Coast Guard admiral controlling Navy, Coast Guard, and merchant marine units. This arrangment was established by a recent agreement between the Commandant of the Coast Guard and me, another example of continuing efforts to maximize joint warfighting capability. Exercise Ocean Safari featured a carrier battle force which included three U.S. carriers, a British carrier and the battleship IOWA, and demonstrated the ability to conduct forward, multi-carrier, allied operations envisioned in maritime strategy.

The exercise lasted some two weeks, and included operations covering an ocean area from Bermuda to the fjords of Norway. SARATOGA departed the exercise at its mid-point, entering the Mediterranean Sea on 7 September to participate in Exercise Display Determination 85. This month-long, Mediterranean-wide NATO exercise involved forces from Italy, Turkey, Portugal, France, the United Kingdom, and the Netherlands. U.S. forces included two carrier battle groups (SARATOGA and CORAL SEA), and a Marine Amphibious Ready Group.

While this exercise was in progress, the cruise ship ACHILLE LAURO was seized by Palestinian terrorists in the Eastern Mediterranean. Units of the Sixth Fleet were on the scene and ready to respond as the act of piracy progressed. At the President's direction, F-14s from SARATOGA intercepted an airliner carrying the terrorists, and four murderers were shortly in custody. The details of this incident have been widely reported, describing the technical and tactical complexity of an operation which required real-time intelligence gathering and fusion, globe-spanning communications, and picking out a single airliner from among scores of other aircraft. I want only to re-emphasize that this was a joint operation, heavily dependent on crucial intelligence from non-Navy sources, without which there would have been no intercept. The Navy simply provided the sharp point for a joint spear, demonstrating again the mobility, availability, and range of capabilities which make naval forces frequent instruments of crisis response.

SARATOGA then made a well-deserved port visit to Dubrovnik, Yugoslavia. It was the first carrier visit to Yugoslavia in five years, supporting U.S. foreign policy objectives in the region as well as sustaining crew morale. On 14 November, SARATOGA transited the Suez Canal enroute operations in the Indian Ocean. On 15 January, SARATOGA returned to the Mediterranean in continued support of national requirements.

SARATOGA's deployment is typical of naval operations in support of strategy. The Navy is at sea, forward deployed around the world, carrying out the elements of peacetime strategy, and doing many of the same things which maritime strategy would require in war.

Operating Tempo

The requirements for forward presence and crisis response in support of national strategy led to an operating tempo even higher than during the Vietnam War. Optempo peaked in 1984 and declined in 1985. Still, it imposes three principal costs. First, it requires a substantial part of a tight budget. Second, extremely long periods at sea cause higher wear and tear on equipment, degrade material readiness and require additional resources. Finally, we see negative retention indicators caused by family separation.

The problem is amenable to solution because, over the past five years, the number and quality of ships and squadrons have grown significantly. As a result, we have established five firm standards for optempo reduction:

o Each ship and squadron will be in homeport at least 50 percent of the time between overhauls.

o Forward deployments will be no longer than six months.

o Turnaround times between deployments will be no less than twice as long as the deployment itself.

o Average optempo for the two forward deployed fleets will not exceed 50.5 days per quarter, 29 days per quarter for the two nondeployed fleets. These figures provide balance between the requirements to restrain budgetary costs, ensure adequate training, and meet commitments.

o Flying hours for tactical aircraft squadrons will be a notional 25 hours per crew per month. This includes flying during battle group operations as well as training and support flights.

The optempo reduction plan is a major effort to complement retention incentive programs you have approved and attack a principal factor in retention decisions: family separation. In addition to meeting personnel needs, reducing deployed time will provide us an opportunity to conduct types of training in our homeports and home waters that is not possible when deployed, such as training for integrated battle force operations envisioned by maritime strategy. The optempo reduction program is only possible, given our world wide commitments, because of a larger and qualitatively improved fleet. Moreover, it clearly presumes that no significant additional commitments occur.

THE NAVY TODAY: ACCOMPLISHMENTS IN TOTAL CAPABILITY

The Navy today is more able to support maritime strategy than at any other time in recent memory. Our capability is evident in the operations which I have described. It is equally evident in a fleet materially better prepared to fight and in capable people with a clear sense of purpose and dedication. Substantially improved funding since 1980 has paid huge dividends. Overall military capabilities of our ships and aircraft squadrons have soared over the past four years; personnel retention remains near all-time highs; weapons, sonobuoys, and spare parts stocks are up markedly. With the maritime strategy we can place these statistics in perspective, and assess our progress against strategy-driven requirements.

Let me now illustrate these observations by reviewing briefly some accomplishments of the past few years, describing current trends, and noting ongoing initiatives.

Total Military Capability

Assessing the Navy's total military capability to respond to national requirements is a complex task. Any assessment must consider four basic "pillars" of military capability. First, ships and aircraft must have the full range of inputs -- integrated logistic support (ILS) in its broadest sense -- to be able to perform the tasks and missions for which they were designed. Second, Navy must possess the proper number, size and types of units to carry out requirements of strategy (force structure). Third, these units must have up-to-date weapons systems and technical sophistication to match a likely threat (modernization). Fourth, they must have staying power to wage protracted war (sustainability).

The pillars of military capability must be carefully balanced, because deficiencies in any one could create exploitable vulnerabilities. A fully manned and trained flotilla of obsolescent coastal patrol boats is no more capable of countering threats to U.S. interests than a sophisticated battle fleet without ammunition, fuel, or trained personnel. Considered together, the four pillars provide data which show dramatic improvement in our overall operational readiness to carry out warfighting tasks against any potential threat.

Integrated Logistics Support Readiness. The most complex element of total military capability is the day-to-day ability of ships and squadrons to perform as designed. One way to look at this is to aggregate selected logistic support inputs -- personnel, equipment, supply support, and training levels -- across mission areas which a ship or unit must perform, such as anti-air warfare or anti-submarine warfare. Based on this aggregate assessment, a unit can be assigned one of four levels ranging from fully ready to not ready. We ensure that as many ships and squadrons as possible remain at the two highest levels.

These aggregate assessments of readiness in selected logistic support elements provide just one index of the extent of the Navy's return on our 46 percent increase in readiness-related expenditures since 1980. As Figure 2 shows, the number of aircraft squadrons at the highest two levels has tripled, and the number of ships has doubled. This accomplishment is particularly striking when compared to pre-1981 negative trends.

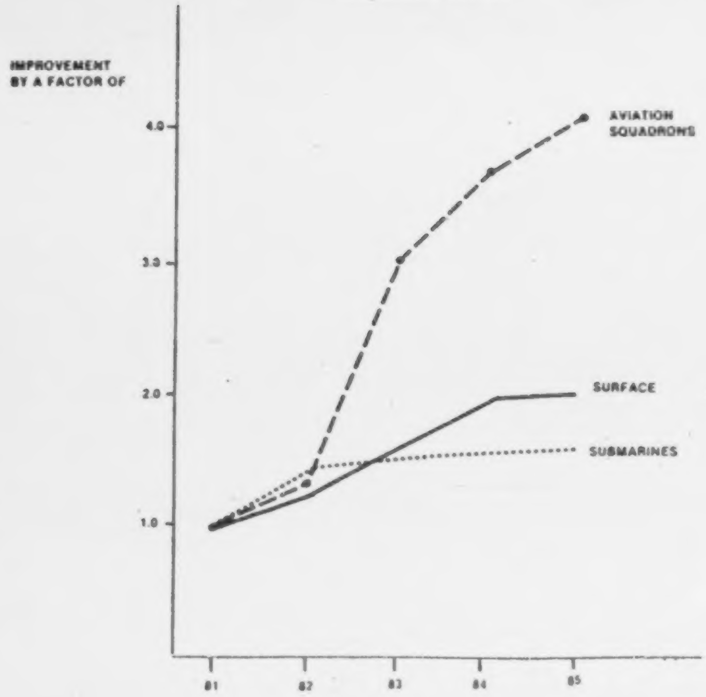
Each sub-component of logistic support readiness has also shown marked improvements, with the personnel element showing the most noticeable growth. Since 1981, we have almost doubled the number of ships manned by crews with the quantity and quality of sailors required to operate the ship to its warfighting limits. Similarly, aviation squadrons in this personnel category increased 16 percent and all submarines have maintained this level in the last two years. This personnel index gauges not only the number of sailors aboard a ship, but their skills and experience. Obviously, this indicator cannot be "fixed" with one appropriation. It has taken years of successful recruiting, training, and retention to arrive at acceptable personnel levels.

The training element of logistics support readiness measures a ship or squadron's preparations to perform its warfare missions, measured primarily through operational drills and exercises. We have made great strides in developing a Navy training strategy that supports the types of operations we envisage in maritime strategy. Clearly deficient areas, such as reserve training, physical security and anti-terrorist training, and battle group tactical training, were specifically strengthened last fiscal year. Improvement efforts are supported through the Fleet Training Assessment Program, which monitors effectiveness of training programs and targets specific areas requiring reinforcement.

Figure 2

IMPROVEMENTS IN LOGISTIC SUPPORT READINESS

SHIPS, SUBMARINES, AND AIRCRAFT SQUADRONS IN TOP TWO AGGREGATE LEVELS

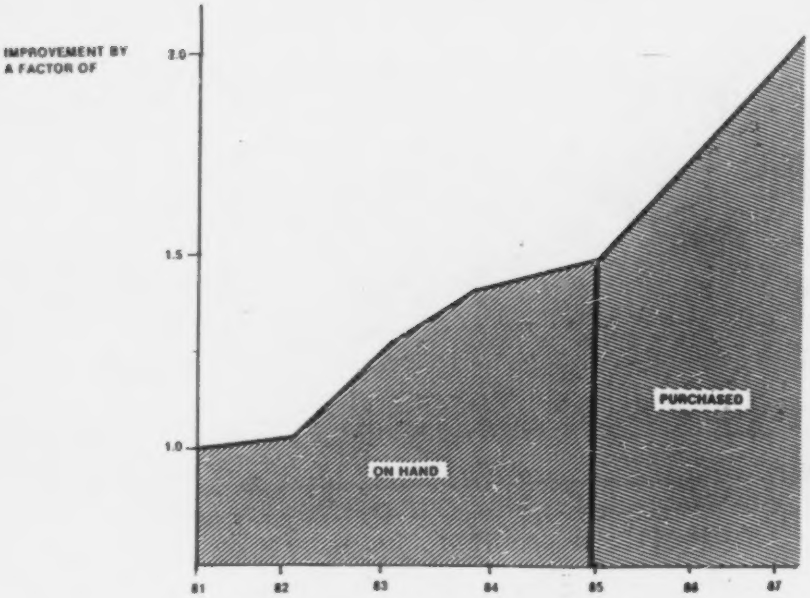


The equipment element of logistics support readiness has improved substantially. In 1981, the average surface combatant had at least one major mission-degrading casualty 58 percent of the time. In 1985, this number decreased to 43 percent with the trend continuing. Improved supply support is an important element of this trend. Spare parts availability has improved dramatically, as Figure 3 illustrates for afloat aviation squadrons. Because of similar improvements fleet-wide, we have reduced the amount of time we wait for repair parts in major casualties by 35 percent since 1981, and improved the initial availability of these parts by almost as much.

Because our crews are more experienced and better manned, our ability to repair our equipment has improved dramatically. Experienced repair technicians aboard ship can now quickly effect repairs which previously would have required outside assistance. Four years ago, the average carrier deployed with some 60 civilian technicians embarked to repair equipment casualties beyond the capability of Navy technicians. In fiscal year 1987 we will deploy carriers without any civilian technicians embarked for the first time in recent memory.

Figure 3

IMPROVEMENT IN SPARE PARTS AT SEA (AVIATION)



Sustained and balanced improvements in integrated logistics support readiness funding have produced steady recovery in the fleet's preparedness. Investments in high quality personnel, spare parts, and training over the past few years are reflected in logistics support readiness levels approaching those which we can and must sustain over the long term.

Force Structure. Perhaps the most visible component of the Navy's improving military capability has been the dramatic growth in numbers and capabilities of ships and aircraft. From 479 deployable battle force units in 1980, we have grown to 546 today, and you have approved the remaining ships necessary to reach the 600-ship goal by 1989. We are building a balanced Navy which will be able to control vital sea areas on a global scale, deny the Soviet Union the ability to concentrate its considerable assets in one theater, and meet the extensive commitments of peacetime strategy. The increase in force structure and capability is one of the true success stories of the defense buildup.

Now that a 600-ship Navy is funded, there are questions about whether a large and balanced force structure can be sustained. Let me put this issue in perspective. Real funding for force structure actually peaked in FY-83, reflecting sharp increases needed to correct the neglect of the 1970's. Now that we have corrected force structure shortfalls, we can move into a sustaining phase where, by building about 20 ships each year, we can sustain a 600 ship Navy indefinitely with minimal growth in force structure spending. The principal reason we can sustain this force structure at low cost is that we have largely recovered from past neglect and we have worked hard and effectively to force procurement costs down.

Specifics of our force structure improvements are summarized in Figures 4 and 5.

Figure 4

SHIP FORCE LEVELS

FORCE STRUCTURE AND MODERNIZATION TRENDS

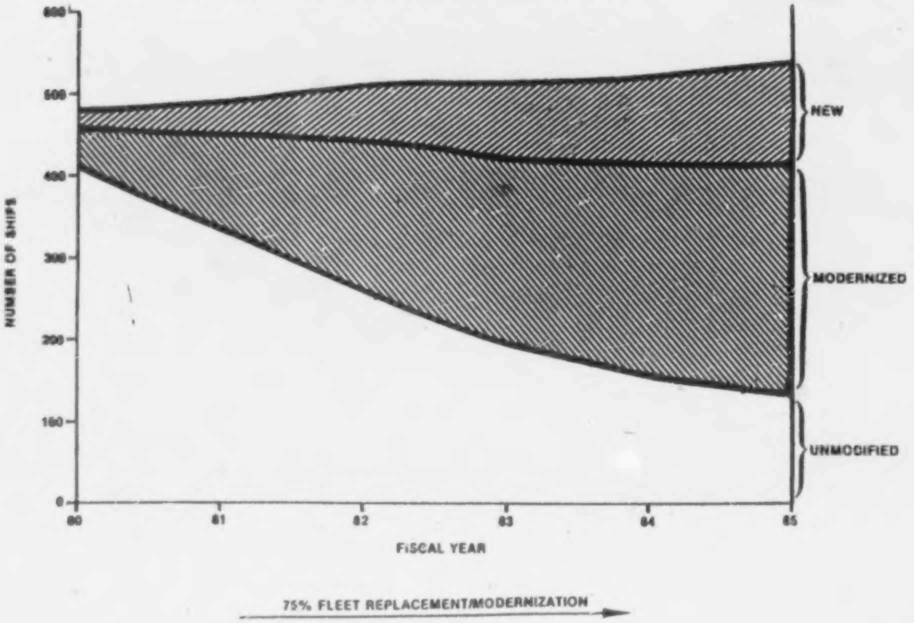
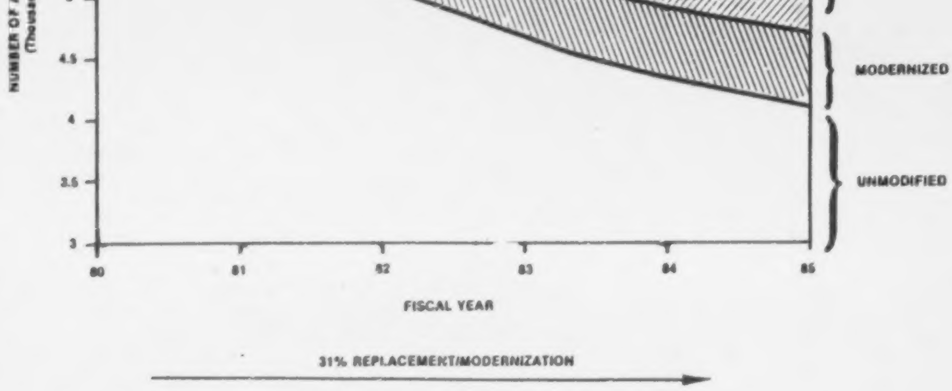


Figure 5

AIRCRAFT FORCE LEVELS

FORCE STRUCTURE AND MODERNIZATION TRENDS



Navy's successful aircraft carrier building program is ahead of schedule and under budget. Commissioning of USS THEODORE ROOSEVELT (CVN-71) is planned for October of this year. ABRAHAM LINCOLN (CVN-72) and GEORGE WASHINGTON (CVN-73) are presently under construction with delivery in 1989 and 1991 respectively. Last spring, USS FORRESTAL (CV-59) became the second ship to complete the carrier service life extension program (SLEP), which is adding 15 years to the lives of older aircraft carriers. USS INDEPENDENCE has commenced SLEP and USS KITTY HAWK is scheduled to begin in FY-88.

Last year, the seventh OHIO class Trident submarine was delivered and the 13th was authorized and funded. The addition of these ships, combined with the introduction of the Trident D-5 missile in 1989, will maintain the survivability and assured retaliatory capability of strategic offensive forces. Fifty-two LOS ANGELES class attack submarines have been appropriated. The most recent of these ships incorporate many improvements, including vertical launch system for TOMAHAWK missiles, enhanced Arctic capabilities, improved quieting and sophisticated new weapon systems.

The contributions of the battleship NEW JERSEY in a globe-spanning deployment have validated the President's decision to bring these powerful ships back into service. Addition of TOMAHAWK and HARPOON missiles to the awesome firepower of the 16-inch gun battery make these ships highly cost effective additions to the fleet. Battle groups (BBBGs) centered around these ships will be employed to maximize their deterrent value in peacetime as an incremental response in crisis situations. BBBGs will be employed either independently or integrated with carrier battle forces, dependent upon the level of potential enemy threat, availability of land-based air support, and other factors. In certain situations, battleships may add flexibility to carrier forward deployment schedules while providing an important capability in maritime strategy.

The fourth CG-47 TICONDEROGA class guided missile cruiser was commissioned and three more were authorized last year. This brings to 19, of a planned total of 27 ships, the number of these highly sophisticated warships which have been approved. Major upgrades being incorporated into the CG-47 class include the vertical launch system, which will accommodate a greater number and variety of missiles in a reliable and survivable configuration; the SQQ-89 ASW system, which adds new sensors and processors and provides for integration of ASW data; and the SPY-1B radar, which provides the capability to handle an even more demanding AAW environment. The Aegis combat system installed in the TICONDEROGA class cruiser will counter the full spectrum of forseeable anti-ship missile threats. Performance of Aegis combat systems has been successfully proven under the most rigorous test conditions, and in extended real-world operations. With the addition of TOMAHAWK, the strike warfare capability of these ships will be enhanced.

The lead ship of the DDG-51 ARLEIGH BURKE guided missile destroyer class was authorized and funded in fiscal year 1985. It will replace the aging DDG-2 and DDG-37 class ships which will begin to retire by the end of the decade. ARLEIGH BURKE will be the most powerful destroyer ever built, with the Aegis combat system, vertical launch missiles, TOMAHAWK, and HARPOON as well as a 5"/54 gun, the Close-in-Weapon System (CIWS), ASROC and torpedoes.

Amphibious forces have been an important part of the building effort. WHIDBEY ISLAND (LSD-41) class landing ship dock is designed to transport four landing craft air cushion (LCAC) vehicles and will add flexibility to the amphibious assault capability of the Navy-Marine corps team by permitting high speed attack of hostile shores from over the horizon. Last year, the lead ship of the class was commissioned, and the final two units were funded.

LHD-1 WASP class is a multi-purpose amphibious assault ship designed as the most versatile amphibious ship ever built. Intended as a replacement for the aging LPH class helicopter assault ships, WASP will significantly increase our lift capability, provide a flight deck for helicopters and vertical/short takeoff (VSTOL) aircraft and a well deck for air cushion and conventional landing craft. The first ship in the class was funded in the fiscal year 1984 budget and will be delivered in 1989. Last year, a second LHD-1 class ship was authorized and funded.

The MCM-1 AVENGER, funded in the FY-82 budget and being delivered in 1986, is the first mine countermeasures ship to be built for the U.S. Navy since the 1950s. She has a wooden hull and non-magnetic machinery and incorporates latest state-of-the-art navigation, minehunting and mine neutralization equipment. Ships authorized in FY-86 will bring to 11 the total number of units. All of these ships will be assigned to the Naval Reserve.

To complement the AVENGER, the Navy requires a class of small but sophisticated mine countermeasures ships designed to clear U.S. ports in wartime. The lead ship of the CARDINAL class was awarded in 1984 and will be delivered in 1988. This minesweeper/hunter will have an innovative design: a surface effect ship with a glass reinforced plastic hull. These will also be Naval Reserve ships.

Seven TAGOS ocean surveillance ships are in commission, and a total of 16 are funded. Early results from these ships and their towed array sonars have been impressive. We are switching from a conventional monohull design to a small waterplane area twin hull (SWATH) design to give us better capability to operate under adverse weather conditions. The lead SWATH ship was approved last year.

Our program to maintain aircraft inventories with the proper mix and numbers remained on track, with 244 new aircraft delivered in FY-85. The total aircraft inventory has not increased markedly, as Figure 5 shows, but capability of the force has increased dramatically. F/A-18 and F-14A continue to replace older aircraft, and new models of A-6 attack aircraft, E-2 airborne early warning, and P-3 maritime patrol aircraft replace older models. Last year, the F/A-18 was integrated with a second carrier, USS CORAL SEA. F/A-18 is proving to be the most easily maintainable high performance jet in the world. USS MIDWAY is scheduled to deploy with the F/A-18 in 1986.

Capabilities of the battle group will be enhanced by the SH-60F helicopter, designed for inner-zone anti-submarine protection. The contract for this sophisticated ASW platform, to replace the aging SH-3, was signed last year. We will embark on full scale development of V-22 OSPREY this year with first flight anticipated in early 1988. This new aviation concept marries helicopter versatility with conventional turbo prop speed and range. It will give Navy and Marine Corps capability to perform a wide variety of missions using a common airframe.

Improvements in sealift are even more dramatic. By the end of 1986, all eight SL-7 fast containerships will have been modified to roll-on/roll-off configuration, providing the ability to deploy rapidly an entire heavy division. All three Maritime

Prepositioning Ship groups will be deployed, providing for rapid deployment of an entire Marine Amphibious Force. Government controlled sealift has grown 30 percent since 1980 and will double again during this five-year plan.

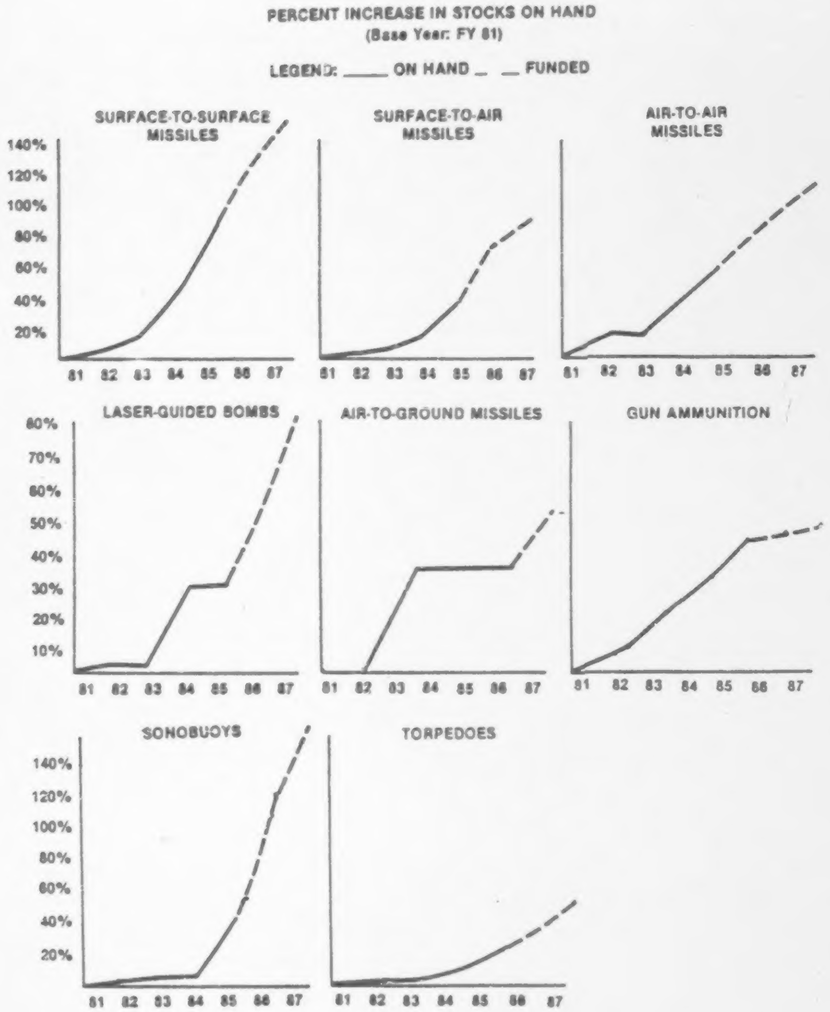
Modernization. To stay ahead of rapidly improving threats, our fleet modernization program is aimed at providing ships and aircraft already in the inventory with improved warfighting and engineering systems. During the past year, we took specific actions to integrate all modernization efforts, strengthening the Ship's Characteristics Improvement Board and establishing a corresponding Aircraft Characteristics Improvement Board to focus and prioritize our efforts. Our Naval Warfare Directorate plays an increasingly important role, ensuring that modernization programs address priority warfighting requirements. Requirements are based on the maritime strategy and are established from a cross-platform viewpoint that avoids piecemeal solutions to an integrated warfare problem.

During FY-85, we performed 121 major systems upgrades on a wide variety of fleet units. Several attack submarines were configured to fire the TOMAHAWK missile, even more had sonar systems significantly improved. Other programs qualitatively enhanced the capabilities of our carrier force by providing selected carriers better defense against air and subsurface threats with the Close-In Weapon System (CIWS), MK-36 Decoy Launcher, Target Acquisition System MK-23, and NIXIE Torpedo Decoy system. Surface combatants were provided defensive systems in the form of CIWS and NIXIE, and the offensive capability of TOMAHAWK.

Sustainability. Ability to fight a protracted conflict is central to maritime strategy. Consequently, we constantly analyze the mix and amounts of ordnance required to support our strategy, through wargaming simulations, doctrine reviews, projected combat sortie rates, and other analyses. Although we have not yet reached all goals in the area, sustainability has been and continues to be the fastest growing part of our budget, going from 4 percent of TOA in 1980 to about 10 percent at present. Ordnance funded over the last four years is beginning to deliver in numbers and fill our magazines. Our stocks of sonobuoys, crucial to countering the increasing Soviet submarine force, are also on the upswing. As Figure 6 shows, we have made substantial progress, and ordnance already funded will soon improve the picture even more substantially. In some categories, our weapons stocks have doubled from the low levels of 1980 and will double again by the end of the decade.

Figure 6

ORDNANCE SUSTAINABILITY IMPROVEMENT



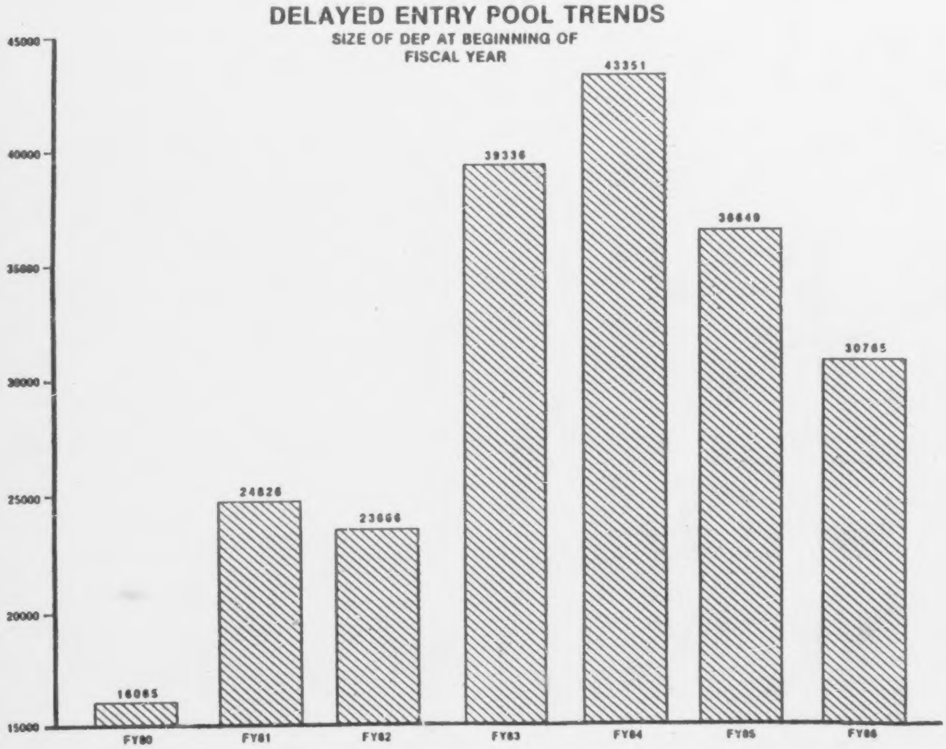
Total Preparedness to Carry Out Navy Missions. The integration of the four pillars defined above comprises our total military capability. For example, it would take a squadron of older cruisers to approach the offensive and defensive capabilities found in one of today's Aegis cruisers, so numbers of ships alone do not tell the whole surface ship story. Similarly, no platform on earth has the strategic striking power of an OHIO class TRIDENT submarine, and again, numbers of ballistic missile submarines alone do not tell the real strategic story. Rather, it is the synergism of all facets of total military capability that needs to be reviewed when measuring our progress. I believe that this systematic and balanced approach to defense spending has resulted in improved fleet capability and preparedness in every qualitative and quantitative sense.

Personnel Accomplishments

The most dramatic recovery of the last five years is the [illegible] in spirit and capability of our people. On day, there are more than one hundred thousand sailors, and women who are truly dedicated professionals, underway ships in defense of freedom. People are our greatest success story and the main reason that our Navy has never been in better shape during my 36 years of commissioned service. Personnel accomplishments have been built on twin foundations of successful recruiting and improved retention. While we continue to be successful, some negative trends now cause concern.

Recruiting. September 1985 marked the 70th consecutive month for achieving recruiting goals in all enlisted programs. On the other hand, while we continue to reach our goals, FY-85 was a tough recruiting year and quality declined slightly from the high water mark of FY-84. A primary bellwether of recruiting trends is the Delayed Entry Pool (DEP), the group of recruits who have agreed to enlist at a later date. This pool, composed largely of high-quality high school graduates, provides a recruiting buffer, serves as a management tool to optimize loading of training facilities, and provides sailors who historically have the highest potential for success in the Navy. Annual changes in the DEP therefore have wide-ranging impacts. Since the total contracts written last year were again fewer than accession needs, the Navy was forced to draw from the Delayed Entry Pool to achieve the required quantity. DEP decreased by 5,884 applicants in just one year as shown in Figure 7. This drawdown of the Delayed Entry Pool is not only a significant indicator of an already more difficult recruiting environment, but also foretells potential problems in the quality level of future accessions. The DEP is not simply a pool from which to draw in difficult recruiting months, it is key to our ability to recruit highly qualified young men and women over the long haul and channel them into technical training at the appropriate time.

Figure 7



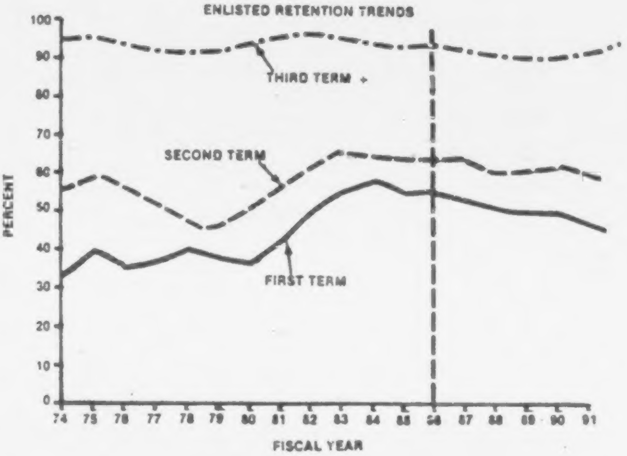
DELAYED ENTRY POOL TRENDS
SIZE OF DEP AT BEGINNING OF FISCAL YEAR

Retention. One of our greatest achievements and continuing challenges has been retaining quality personnel needed to man a 600-ship Navy. As shown in Figure 8, we have continued to do well, although we did not achieve the high retention rates of FY-84. We have significantly reduced undermanned ratings from a high of 62 in FY-82 to the present 28, out of the Navy's total of 102.

Figure 8

ENLISTED RETENTION RATES

	FY-82	FY-83	FY-84	FY-85	FY-86 PROJ
1st Term	50.3%	55.7%	58.0%	54.6%	55.5%
2nd Term	63.0%	65.4%	64.4%	63.9%	64.7%
3rd Term	95.3%-	96.6%	94.9%	93.4%	94.3%



UNRESTRICTED LINE OFFICER RETENTION RATES

	FY-82	FY-83	FY-84	FY-85	FY-86 PROJ
Surface	43%	45%	50%	47%	47%
Surface (Nuclear)	21%	45%	42%	39%	39%
Pilot	48%	58%	58%	53%	48%
Naval Flight Officer	73%	74%	81%	73%	74%
Submarine (Nuclear)	39%	40%	47%	48%	48%
General Line	44%	60%	59%	64%	63%

Selective Reenlistment Bonus (SRB) program has been a key component of our successful retention program. We have been able to provide adequate incentives for critical ratings at a time when employment opportunities outside the Navy are increasing. For these highly technical specialties, it is clearly less expensive to keep trained personnel in the Navy with SRB than to recruit new personnel of comparable quality, provide them extensive technical training, and develop their practical skills on the job. It was gratifying to see a recent GAO report confirm that Navy is managing SRB well. We concur with GAO's observation that SRB could be even more cost-effective if Congress would approve a return to the lump-sum method of payment. The authority granted to pay 75 percent is a step in the right direction.

Officer retention has also shown strong success over the past four years, although we saw disturbing trends in FY-85. Retention decreases for surface, nuclear surface, and pilots are of particular concern. The challenge to retain midgrade officers will be increased in a steadily improving economy.

Manning. The Navy's highest priority is to ensure that its fighting units are fully manned to sustain combat operations for the duration of any likely deployment contingency. About fifty-four percent of total strength of 581,300 men and women are now assigned to strategic, tactical and mobility forces compared with 48.9 percent in 1979. This sizable improvement in our "tooth to tail" ratio makes us a more formidable fighting force. However, growth in Navy end strength has not kept pace with force structure increases as we build to 600 ships. This has exacerbated a manning problem in fleet support installations and various shore activities, and, unless corrected, raises the prospect of undermanned ships as more are delivered. As our experiences of the late 1970s indicate, undermanning is sure recipe for serious readiness decline.

Quality. The improved quality of our personnel has been evident in many accomplishments including an associated substantial decline of disciplinary problems. First term enlisted attrition in FY-85 decreased to about 11 percent from 25 percent level of the late 70s. We have had the luxury of discharging consistently marginal performers through our Project Upgrade initiative, but improved force quality permitted us to discharge significantly fewer in each year of the program, starting with almost 5,000 in FY-82 and improving to only 441 in FY-85. The desertion rate has also declined. The FY-85 rate of 10.1 per 1000 is the lowest the Navy has experienced since 1972 and is only a fraction of the FY-77 level when we experienced a high of 31.6 per thousand. Similarly, the unauthorized absence (UA) rate continued to improve with FY-85 being the sixth consecutive year showing a decline. The FY-85 UA rate of 32.7 per 1000 was 25 percent better than last year's rate and 60.8 percent better than FY-79.

An aggressive, tough, but fair approach to alcohol and drug abuse has shown concrete results. Since 1980, when surveys indicated 48 percent of our E1-E5 population were using marijuana, there has been a steady and significant decline. Today, we use the most sophisticated testing system available and less than 3.0 percent of urinalysis tests being conducted Navy-wide are confirmed positive. As we eliminate the drug culture from the Navy, standards for retention are getting higher. Rehabilitation for drug dependency is now being offered only to those petty officers who exhibit exceptional potential. As a result of this new policy, two treatment facilities in San Diego have been combined into one. We are also consolidating Counseling and Assistance centers (CAACs) and Navy Alcohol and Drug Safety Action Program (NADSAP) facilities where feasible. We have been able to shift the Navy's focus and a half million dollars from drug rehabilitation to drug prevention programs.

Naval Reserve Personnel. Stimulated by horizontal integration of Reserve assets into the Total Force, reserve manpower has steadily increased since 1982. In 1983, the Sea and Air Mariner (SAM) program was developed to access non-prior service reservists into the Selected Reserve to fill E1-E3 mobilization billet requirements. To meet Selected Reserve junior officer requirements, we have created the officer adjunct to this program to access college graduates and provide them basic qualification training. We have also made a good start on efforts to improve the Individual Ready Reserve (IRR).

Quality of Life

Family considerations have a tremendous impact on the retention and readiness of our active duty forces, and meeting family needs is of vital importance in keeping the fleet ready. Recently, a national business magazine carried an article entitled "Ten Terrific Employers." The article noted the best employers not only took care of their people but took special care of their families as well. It came as no surprise to me that one of the "terrific employers" was the United States Navy. Let me provide you a few of the reasons.

A strong Family Support Program includes assistance to members and their families delivered through a network of Family Service Centers (FSCs) first funded in FY-81. Sixty-three are in operation and by the end of FY-87 all of the planned seventy centers will be open. In a recent three month period FSCs assisted approximately 250,000 people. I am also proud of our child day care initiatives. Navy centers now provide child care for over 15,000 of our sailors' children daily, and we have undertaken Family Home Day Care initiatives to begin meeting excess demand.

We will build 845 units of Military Family Housing in FY-86. Our long-range construction plan will reduce our buildable deficit of 11,600 units to 4,776 units by FY-91. We have averaged nearly 7,000 spaces of new Bachelor Housing construction over the last three years. In both programs we are dedicated to providing adequate housing to members and their dependents, with special emphasis on our more junior personnel and those assigned to extremely high cost of living areas.

Congress has suggested that the Department of Defense seek more third-party financing for military housing construction where life cycle cost analyses indicate overall savings. In September 1985 we negotiated the first such arrangement, validated as economical by the Office of Management and Budget. It was submitted for approval to the four Defense MILCON Subcommittees, but was deferred by the HAC with a suggestion that we renegotiate for lower costs. There are indications that even if successful, we will continue to encounter scepticism in the HAC Defense MILCON Subcommittee. I seek support of Congress to continue this program into execution where economically advantageous.

Congressional initiatives to ease the financial burdens on sailors' families during their moves, many to the highest cost areas of our country, have been enthusiastically received. Moves usually cost Navy families significantly more than their moving allowances and are a major disincentive when families consider reenlistment. Expanded allowances have reduced but not eliminated the shortfall. The authority to pay expanded allowances for temporary lodging, increased travel and transportation allowances, and advance payment of housing-related allowances are responsible for ground gained in this area. I ask for your commitment to continue to strive for reimbursement equity of uniformed Navy men and women with their Federal civilian counterparts.

The Dental Insurance Program proposed for active duty dependents has received wide support in the fleet. Such a contributory enrollment-type plan is evidence that we care about families' well-being and are prepared to assist in defraying the cost of dental care they require and deserve.

In addition to the family programs I have described, we have undertaken a variety of efforts to improve quality of life in the ships of the fleet. Health care professionals regularly visitall operational units to provide command programs in fitness, stress management, nutirition, smoking cessation and weight control. Shipboard exercise rooms are proliferating as command fitness coordinators implement the Navy's Fitness for Life initiative, created as a positive alternative to drug and alcohol abuse. Only by making an on-going commitment can we continue to attract and keep the quantity and quality of personnel needed.

Total Force Improvements

The Navy's total manpower needs result directly from requirements of the maritime strategy. However, the size and composition of the active Navy are constrained by affordability and attainability limits, requiring intelligent use of our Reserves. We have moved forward aggressively to integrate and maximize Reserve contributions while ensuring that no missions are transferred to the Reserves which either result in a net degradation of readiness, cannot be supported by available Reserve manpower, or are costlier than leaving them with the active forces.

The focus of this process is "horizontal integration." Front-line ships and aircraft now compose a high percentage of the Reserve inventory, including increasing numbers of Reserve OLIVER HAZARD PERRY and KNOX class frigates. Both Reserve carrier air wings already fly or are programmed to receive fleet compatible state-of-the-art fighter, attack, and surveillance aircraft. Additionally, we have programmed new medium attack A-6E and EA-6B squadrons for Reserve wings so they will be completely modernized in synchronization with delivery of the two newest aircraft carriers. The day-night cycle flight operations by a Reserve air wing aboard USS RANGER in January of this year have demonstrated the progress of horizontal integration. The squadron augment unit (SAU) program initiated in 1984 integrated Reserve training into active fleet units and increased total force readiness. SAU air crews not only fly the same aircraft but also perform annual active duty for training with their gaining squadrons. I intend to continue and expand the number of participating Reserve aircrews. One-third of the P-3 ORION Maritime Patrol Aircraft squadrons are in the Reserve. These squadrons fly the modern P-3 ORION TACNAVMOD aircraft which allows Reserve flight crews to deploy and operate side by side with active squadrons.

The planned transfer of 25 additional active ships and the introduction of 31 new mine warfare ships and 22 craft of opportunity by 1992 is particularly ambitious. Trends in combat readiness for surface units already in the Reserves are gratifying. Four years ago, only one Reserve surface ship in five reported combat ready. Today, three out of four are in that status.

Establishment of Maritime Defense Zones (MDZ) is an important new initiative involving reserve and active units from the Navy and Coast Guard. MDZ commands have responsibility for protecting U.S. harbors and coastal sea lines of communication during major conflicts. Analysis has shown many existing Naval Reserve Units, such as Craft of Opportunity, Inshore Undersea Warfare, Mine Countermeasures, and Naval Control of Shipping units are able to contribute to this coordinated effort. In addition, in the event of mobilization, Naval Reserve coastal defense units will augment Coast Guard headquarters and sector command staffs.

Accomplishments in total force management are crucial to carrying out the maritime strategy. We have developed a system that ensures that we can wisely incorporate a growing reserve into the total force. However, there are limits on our reliance on the naval reserve which relate to availability during periods of crisis. The President's 100,000 call-up authority is insufficient to provide Navy the requisite augmentation, in both size and type, during a period short of war. Because of this, reserve integration becomes more difficult and must be approached with caution to ensure readiness to meet reasonably foreseeable requirements is maintained.

SUSTAINING ACCOMPLISHMENTS: NAVY INITIATIVES

Responsible stewardship of taxpayers' money is essential to maintaining the trust and confidence of the American people. It is truly ironic that while the public has been treated to a succession of procurement "horror stories" that total less than one million dollars over two years, the Navy has undertaken ambitious initiatives which have returned to the Congress, for their reallocation, billions of dollars. Navy has a solid track record of keeping the public trust, and a record of innovation in using funds more efficiently. We are proud of leading the assault against the old ways of doing business and are committed to future improvements. We should be allowed freedom to optimize the process that results in over 3 million contracting actions annually.

Navy Acquisition Management

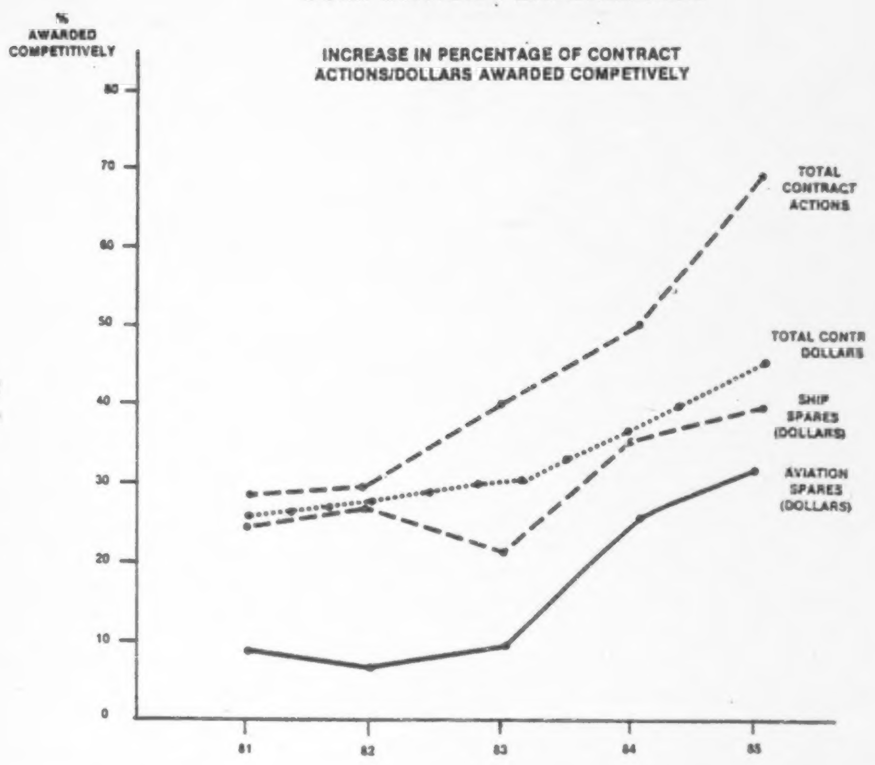
Competition and Cost Trends. An ongoing success story is our progress in using procurement competition to advantage. The Navy's turnaround in competition performance since 1982 is graphically portrayed in Figure 9. For FY-85, we awarded 45 percent of all contract dollars and 69 percent of all contract actions competitively. In dollar terms, this meant we awarded $20.2 billion competitively, an increase of $5.7 billion over FY-84 and almost $11 billion over FY-82. In the shipbuilding and repair industry, the percentage of dollars awarded competitively has increased from 15.7 percent in 1980 to 84.3 percent in 1985. The establishment of the flag-officer position of Competition Advocate General of the Navy, long before such positions were required by public law, has proved to be a wise decision and an important part of success in competition.

Results of the project to Buy Our Spares Smart (BOSS) are heartening. After two years in operation, the program has screened 225,658 spare parts, breaking out 30,347 of them from the original equipment manufacturer for full competition or direct buys and contributing to a total cost avoidance of $347.5 million. In addition, the "Price Fighter" initiative has reviewed over 3,600 items with cost savings of $2 million through a systematic determination of fair cost. In spare parts procurement we had our greatest competitive success, more than tripling the level of only two years ago.

Savings achieved through shipbuilding competition FY-83 through FY-85 exceeded $2.5 billion. $248 million was saved in the LOS ANGELES class nuclear attack submarine program and $840 million in the TICONDEROGA class cruiser program. Savings in the shipbuilding and conversion account have allowed us to accelerate several programs without having to use additional funds; for example, reactivation of the battleship MISSOURI was paid for with funds saved in other programs.

Figure 9

COMPETITION PERFORMANCE

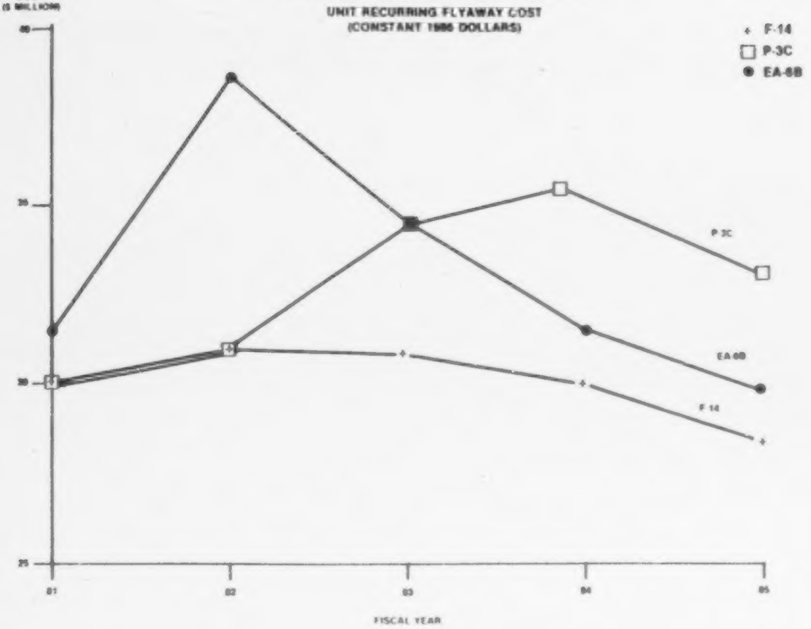


Particularly in aircraft procurement, other initiatives also have reduced costs. Specification changes to existing contracts are approved only if they affect safety. This approach has reduced changes by about 95 percent. We buy what is essential for combat capability without contract changes and gold-plating. Introduction of fixed price contracts as the norm has also helped reduce the price for high performance aircraft. Results of these efforts are reflected in aircraft cost trends shown in Figure 10. These reductions should be considered with the knowledge that aircraft prices had gone up approximately 10 percent per year above inflation for almost 30 years.

Manpower, personnel and training costs account for more than one-third of the total life cycle costs of weapons systems. Opportunities to reduce life cycle costs occur early in system development. We have developed the capability to make hardware-manpower tradeoffs and to identify requirements at the earliest stages of system development, through the Navy HARDMAN Program. Commencing this fiscal year, the rigors of HARDMAN analyses will be applied to all new starts in all acquisition categories.

Figure 10

RATE ADJUSTED COST TREND



Materiel Professional Program. Procurement initiatives must be implemented by highly trained, competent people. In 1985 we instituted the Materiel Professional (MP) program, a new officer career path. The Navy "blue suiter" is absolutely essential to successful materiel management, providing continuity and an operational perspective. The MP career path is designed to develop the same level of professionalism in materiel management that we have in warfighting. This community now includes one Admiral (the VCNO), five vice admirals, and 49 rear admirals, as well as some 780 captains and over 70 senior commanders directly responsible for the management of the materiel processes. We are selecting quality officers, with training and experience to get the job done right.

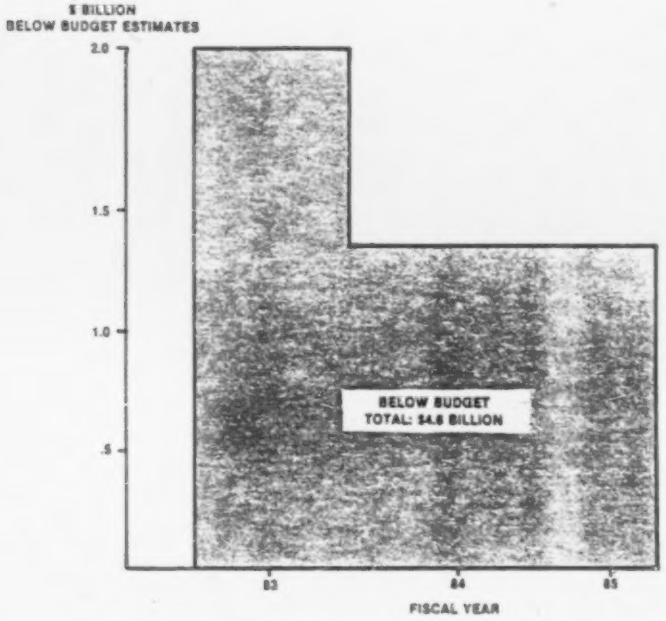
Procurement Trends. Through a combination of improved management, competition, and lower than expected inflation, we are building a 600-ship Navy at much lower cost than originally expected, as Figure 11 shows graphically. When you hear stories about $400 claw hammers -- which, by the way, we discovered and never paid for -- I ask that you keep such stories in perspective.

I want to caution, however, that the difference between estimated and actual costs is being driven to a minimum. Our current budget requests fully reflect the expected results of management initiatives, competition, a buyer's market and lower inflation indices, and are thus unlikely to continue the magnitude of cost savings experienced in previous years. If Congress continues reducing prior-year programs, as was done in the FY-86 continuing resolution, or acts on the expectation that additional unobligated funds will be generated in the FY-87 program, there is a risk that we could have insufficient funds to execute authorized programs.

Figure 11

COST REDUCTION IN BUILDING 600-SHIP NAVY

FY 83-85 PROGRAMS



Joint Procurement Initiatives

Initiatives designed to save money are also evident in the joint arena. Recognizing that weapon commonality is possible in many cases, we have developed a proven track record in joint procurement of ordnance. For example, the Navy and Air Force have coordinated development and procurement of a wide range of missiles including the TOMAHAWK, HARM, SPARROW, and SIDEWINDER. Economies of scale resulting from this cooperation have resulted in major cost savings.

The Joint Requirements and Management Board was created in 1984 within the Office of the Joint Chiefs of Staff. It consists of the Vice Chiefs of Services whose task is to increase and improve joint development of weapons systems. It had significant accomplishments in its first year of operation. In the area of remotely piloted vehicles and tactical cruise missiles, 17 service programs have been consolidated into seven joint programs which will save $4 billion in acquisition costs.

In similar fashion, the Joint Logistics Commanders (JLC) has streamlined operation as a forum for subjects of mutual interest and exchanging information among the Service acquisition communities. An example of JLC sponsored mutual support and joint efforts are savings which are expected in the tri-Service H-60 Helicopter program, totalling $111.5 million.

The recent creation of the Joint Assessment and Initative Office will ensure that this momentum is not lost. This office will evaluate initiatives, some identified by our Unified Commanders, which require joint programmatic support. Navy has joined the other Services in a Memorandum of Agreement on cross-Service participation in program development, enabling each Service to identify the other's key programs essential to joint combat operations.

I am pleased with today's spirit of inter-Service cooperation and would classify it as the Pentagon's leading growth industry. The Memoranda of Agreement that the Service Chiefs have signed address the hard issues of warfighting responsibilities. I am confident that we can continue to work together in the dynamic process of resource allocation.

Other Initiatives and Special Issues

Wargaming the Navy Program. Wargaming is an increasingly useful tool not only for evaluating strategy, but for providing insights into acquisition programs as well. Last year, for the second consecutive year, we tested our programmed force against the projected Soviet threat in a wargame at the Naval War College. The game produced a number of insights, this budget incorporates the results. We will continue to expand this effort.

Anti-Submarine Warfare. Of all Soviet Navy developments over this past decade, the improvements in their submarine force have been the most striking. Consequently, I directed a far-ranging reassessment of the ASW component of maritime strategy, and of the resulting research, development, and acquisition programs. As a result of this effort, we have a sound ASW strategy, and a range of R&D initiatives to support it. From these initiatives, we will develop the technologies necessary to ensure continued ASW superiority.

Space. Navy is the largest tactical user of space-based systems, using on a daily basis more than 85 percent of all satellite capacity provided to the Armed Services. There is growing recognition that space is a critical element of our combined arms approach to naval warfare. This past year, the Navy established a Space and Naval Warfare Systems Command to provide space systems development, acquisition, and integration focus. Within my own staff, I have broadened the charter of the Office of the Director, Command and Control and given him the responsibility for all space-related issues. Naval Space Command is fully operational and, as a component commander to the new Unified Space Command, is working to make the most of unique capabilities space can provide the military. We are forming a Space Technology Center at the Naval Research Laboratory to harness the expertise resident in the naval laboratory system for maximum support of the naval space program.

Improved maintenance techniques. Navy is finding new ways to achieve cost-effective maintenance and repair programs. Because our preventive maintenance is improving, for all the positive support and personnel reasons I mentioned previously, our repair requirements are abating. We are also finding ways to save on major overhaul and repair contracts. A phased-maintenance program aboard several of our classes of ships ensures that primary engineering and combat systems will be maintained and modernized continually during the ship's life, thereby reducing the requirement for periodic major overhauls.

The previous four to five year overhaul cycle has been lengthened to as much as 10 to 12 years for some ships, saving money and increasing readiness. Reliability centered maintenance procedures which focus repair efforts on equipment most in need of work have become the fleet maintenance strategy. Our drive to eliminate unnecessary work has led to an overhaul philosophy of "if it ain't broke, don't fix it." This zero-based approach to major equipment overhauls has saved time and money and actually improved material readiness.

Reducing Administrative Burdens. Management initiatives can save time, effort, and paperwork as well as money. Left unchecked, paperwork grows until it becomes a detriment to readiness. We have initiated an assault in this problem and already have reduced the demands for reports from our operational units by 50 percent. Over 600 reports have been cancelled, and I intend to see this number grow. Our directives place a moratorium on new reports and require that there will be no future growth in reports without corresponding reduction. There are no exceptions to this policy.

Fundamental to improved administration is the SNAP (Shipboard Non-tactical ADP Program) system to manage better logistics, maintenance, supply, and administrative functions aboard ship. We have this system in nearly 300 ships and will install 100 more systems in FY-87.

Staff reductions. There is a tendency for bureaucracies to grow if unchecked, and we were beginning to experience the adverse effects of redundant bureaucracies. Too many people were working the same problem, creating paper logjams and slowing the decisionmaking process. Our solution was to meet this problem head-on and abolish the Naval Material Command. We eliminated a total of 450 NAVMAT positions, plus another across-the-board 10 percent cut in all remaining Systems Command headquarters staffs, after conducting an extensive billet review to ensure that all necessary tasks could still be accomplished. Growing headquarters staffs and bureaucracies do not enhance combat readiness and Navy is proud to repeal the "iron law" of bureaucratic bloat.

Supply Management Improvements. We have initiated actions to identify and correct supply system procurement, physical security, and inventory management problems. Our introspective look at supply policy and procedures has reinforced numerous actions to improve fleet supply support. Over 252 management actions were ordered to correct the problems we found and over half have already been completed. These actions cover several areas including emphasis on personal accountability, regulatory integrity, improved inventory management of ADP systems, tightened physical security, and a code of ethics for material and financial managers. Remaining actions are being monitored closely and will support our goal of balancing high readiness with increased accountability.

Security. Navy has been shaken by revelations of espionage which spanned a number of years and involved a number of people. Damage done by thse espionage activities is still under review, but a preliminary assessment is that Navy and other defense elements have suffered severe compromises in some areas. The damage is, however, reversible. Many compromises of communications and submarine-related operations data were perishable (time-sensitive) information. We believe we are no longer vulnerable in these areas. The damage assessment regarding other systems and tactics is continuing.

We have initiated new controls and programs to repair the damage and to assure future espionage will be difficult to commit and easier to detect. Stricter controls for handling cryptographic material have been instituted. There has been a significant reduction in the number and level of security clearances. A program is underway to conduct screening polygraph examinations of a specified number of Navy personnel who have access to very sensitive information. We have expanded our counterintelligence briefing program and technical surveillance countermeasures equipment is being upgraded. Procedures for granting security clearances are also being upgraded and centralized. Finally, we have formalized a process to alter operational procedures at sea where necessary to reduce Soviet confidence that they can now predict our weapon system employment concepts because of the Walker case.

We need the support of the Congress to provide additional measures to guard against and deter future espionage activities. The offense of espionage, committed during time of war or in peacetime, irrespective of the motive, should be punishable by the death penalty. Amendment of the Uniform Code of Military Justice (UCMJ) to authorize the death penalty for those under military jurisdiction and convicted of espionage was a positive first step. But Title 18 must be amended to increase the range of sentences for conviction of espionage for those not prosecuted under the UCMJ. We should reduce the number of hostile intelligence collectors in the U.S. Legislation should be passed to control Soviet/Warsaw Pact and aligned diplomatic, consular and trade personnel in the U.S., both in number and in their ability to move about, especially in national security sensitive areas. Legislation should apply to nationals of those countries employed by the U. N. Secretariat.

While much needed authority for federal investigators to have access to state and local criminal records has been granted, in view of the motivation exhibited in recent cases, access to financial records is also required. A program is needed to reward those who provide information leading to the arrest and conviction of individuals involved in espionage, to seize the fruits of espionage crime and to prevent those convicted from profiting by publication about their illegal activities. Finally, consistent with our need to conduct counterintelligence polygraph examinations for armed forced members and DOD civilian personnel, use of such examinations for defense contractors should not be unduly constrained. Our debriefings to date have shown that the polygraph potential is a primary deterrent against espionage activities.

In summary, espionage activities have had a significant impact on our Navy. As a result, we have felt an obligation to be in the forefront of identifying highly improved security policies, procedures, awareness, and technologies. We will continue to emphasize the professional element of accountability in naval leadership.

FOIA. Recent interpretation of the Freedom of Information Act (FOIA) raises potentially serious problems. Before 1985, DOD exempted technical materials which, although set forth on paper "records," are actually commercially valuable property. Early in 1985, as a result of a court decision, Department of Justice (DOJ) determined that exemption of these items was improper. Navy is now responding to FOIA requests for 100,000 P-3 aircraft engineering drawings and 39,000 engineering drawings for Pratt and Whitney engines, representing the beginning of a potential deluge of similar requests. We do not believe that Congress intended FOIA to release commercially valuable and competitively sensitive information and request that the Congress clarify its intention.

SUSTAINING ACCOMPLISHMENTS: THE FY-87 NAVY BUDGET

As you have reviewed this report's graphs and statistics which show improvements, I hope you have also considered ramifications for national security had the downward trends of the 1970s been allowed to continue. Regaining our strength has been difficult and expensive. Now that we have largely recovered, we have an opportunity to sustain recent accomplishments at modest cost, and avoid the necessity for another expensive recovery program in the future which will otherwise be heaped upon our successors.

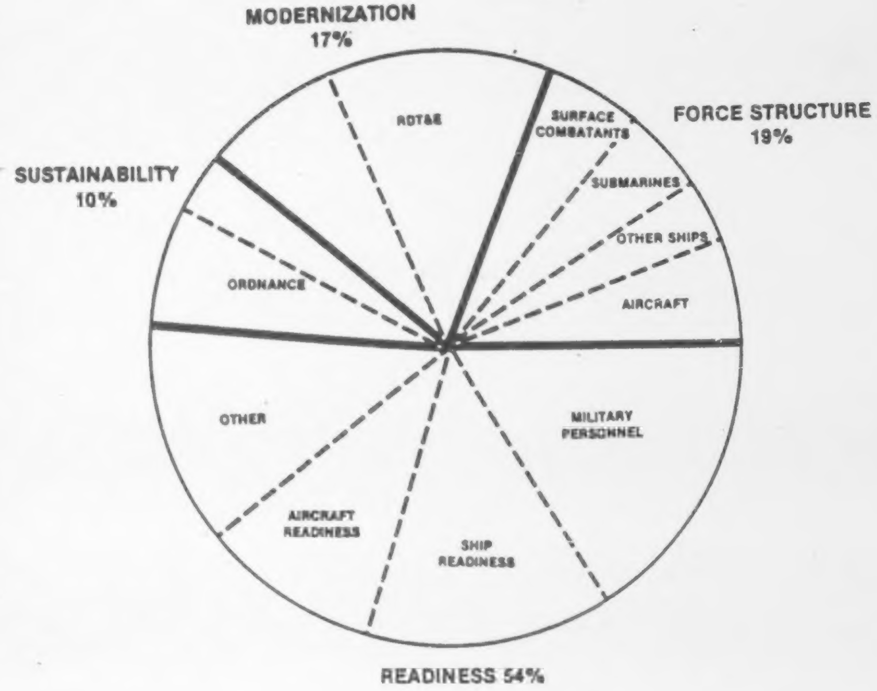
Navy's FY-87 budget requests a Total Obligational Authority (TOA) of $94.3 billion. We have been successful in increasing competition in procurement, decreasing unit costs, and learning to be more efficient in many areas. While these initiatives help reduce the magnitude of cost growth, they cannot eliminate it altogether. I recognize that we are at a time of hard decisions about the nation's budget deficit. But I ask that you look closely at requirements which derive from national and maritime strategy -- not only wartime requirements, but extensive peacetime operations in support of this nation's interests, and the resultant demands on the Navy to respond to crises an average of six times per year. I believe you will conclude that this nation needs the 600 ship, modern, and balanced fleet, with high levels of readiness and sustainability, manned by high quality people.

The Navy budget is sound because it is focused, disciplined, and shaped within a single frame of reference: the maritime strategy. In Navy program planning, maritime strategy provides the point of departure for a series of subsidiary strategies, master plans, and appraisals which identify and prioritize requirements. These appraisals involve analyses of strategy-derived warfighting requirements, looking at threat and requirements now and for the next several years. This process results in a thorough annual assessment of what Navy can and cannot do in support of strategy, where changes to programs are necessary, where new programs are required and which programs should be cut.

Navy's budget is not exclusively a Washington exercise, devoid of any connection with the operational Navy. The Fleet Commanders-In-Chief have an increasingly powerful and institutionalized role in the Navy budget, just as Unified Commanders have an increasingly important role in the Defense budget. For example, because the CINCs' unanimous top priority has been improving ordnance stocks, sustainability has been the fastest growing sector of our budget, having increased by 135 percent since 1980 -- almost three times the overall TOA growth rate. The budget balances the longer-term perspective of the Navy Headquarters staff with the CINCs' nearer-term focus and sense of urgency. This ensures a budget properly balanced among the four previously-discussed pillars of total military capability: integrated logistics support readiness, sustainability, modernization, and force structure. Figure 12 shows the current balance:

Figure 12

FY-87 NAVY BUDGET BY PILLAR



ILS Readiness

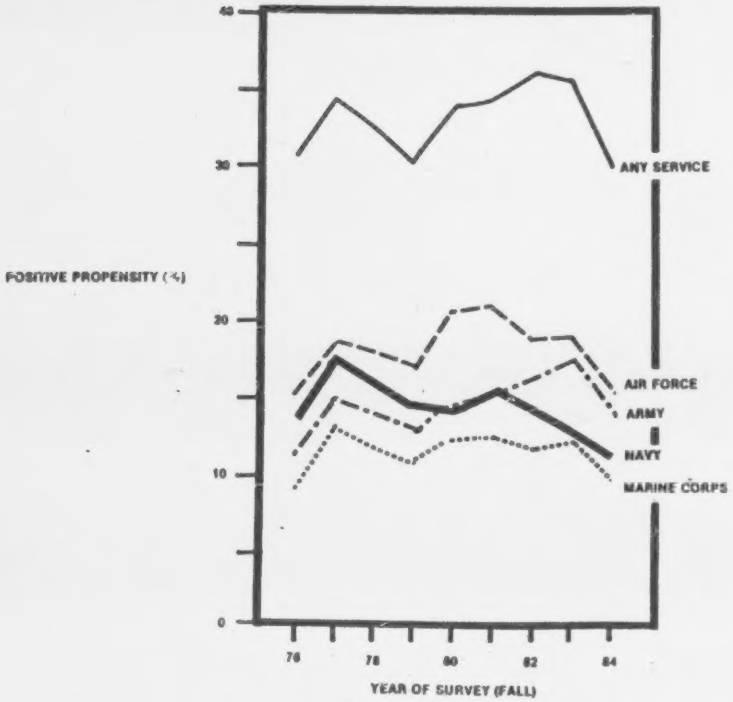
ILS readiness funding includes personnel, spare parts and other support items, fuel for ships and aircraft, training costs, and other items required to support the day-to-day ability of ships and squadrons to perform their designed tasks and missions. This pillar accounts for over half of Navy TOA, belying suggestions that this component of total capability has been sacrificed for force structure.

Approximately one-third of this request is for military personnel. This is the most critical part of our entire budget given the extraordinary impact of personnel readiness on total Navy operational readiness. This year, I am particularly concerned with adequate funding to recruit required numbers and quality of personnel, to retain critically needed personnel, and to provide modest end-strength growth for the growing fleet that the maritime strategy requires. In this fiscally constrained environment, the Navy budget reflects a firm belief that personnel programs remain our highest priority and the foundation of the Navy's continued success.

We have continued to meet recruiting goals by drawing down the Delayed Entry Pool. Recruiting trends are down and long-term indicators are disturbing. Since 1981, the primary population of young men from which we most heavily recruit has declined by 5.4 percent and will decline by another 17.9 percent before it bottoms out in 1996. Therefore, we must recruit a higher percentage of the population. But recent surveys show that this group's positive propensity to join the Navy is declining as shown in Figure 13. Many of the causes of this decline are not within our control, but at least two are: advertising programs and recruiting manpower. To continue to meet recruiting goals we must ensure adequate resources for these two key areas.

Figure 13

POSITIVE PROPENSITY TO SERVE ON ACTIVE DUTY FOR YOUNG MALES (16-21 YEARS OLD)



Retention in general has been excellent, but in critical areas, problems are emerging. Loss of mid-grade, experienced aviators is one of these. This shortage is now in excess of 1100 pilots, with resignations continuing at about 500 annually. This could continue through 1990 as airlines continue to expand and replace retiring pilots. Compounding the problem is a relatively healthy economy which affords other employment opportunities as well. Thus far we have been able to manage this shortage through carefully managed distribution policies, but not without adverse impact on personal and career needs of individual aviators.

Increased compensation, such as Aviation Officer Continuation Pay (AOCP), is a tool we can use to improve aviation retention. The AOCP acceptance rate, however, has steadily decreased. Value of AOCP has been eroded by inflation, concomitant Aviation Career Incentive Pay (ACIP) reduction, and Hazardous Duty Incentive Pay (HDIP) restrictions while under contract. Legislative changes and improvements to AOCP are required to restore its effectiveness. AOCP remains the critical compensation initiative the Navy needs to preclude a return to the high pilot losses of the late 70's.

We also have a shortage of experienced nuclear-qualified officers in grades of Lieutenant Commander through Captain. These officers are required for service at sea in nuclear powered ships and in shore billets directly supporting fleet readiness and nuclear propulsion plant safety. Enhancements to Nuclear Officer Incentive Pay (NOIP) contained in the FY-86 defense authorization will help reduce this shortage substantially over the next five years, but close monitoring is required. A continuation of authority to temporarily "spot" promote officers to Lieutenant Commander (LCDR) is requested as we are still forced to place high quality Lieutenants in LCDR engineering billets because of our shortages.

Unique demands of sea duty increase our Permanent Change of Station (PCS) requirements. It is simply not feasible to have the number and diversity of shore duty billets in each homeport which would permit most sailors to rotate from sea to shore duty and back without PCS moves. Consequently, our ability to reduce PCS is limited by the need for equitable sea-shore rotation. Your support for funding to execute a balanced PCS program which will support reasonable sea tour lengths, provide reenlistment incentives, correct manning imbalances, and allow necessary training will go a long way toward improving quality of life and, as a result, Navy readiness.

Enlisted TAR personnel serve tours of sea duty side-by-side with USN counterparts on Reserve ships, yet they are not eligible for the same retention incentives. We have requested authority to pay a Selective Reenlistment Bonus (SRB) to a limited number of TAR personel in critical ratings to enable us to man the active duty portion of an expanding number of ships in the Naval Reserve Force (NRF). We are also requesting authority for a modest Unit Incentive Pay for Selected Reserve crew members of our Naval Reserve Force ships. Compensation initiatives such as these are critical to our ability to continue the growth of Reserve strength to programmed levels and to man the modern warships we are placing in the NRF.

We have an urgent need for a relatively small increase in manpower to support the growing fleet. You have funded the ships and aircraft for a 600-ship Navy by 1989. Personnel growth has not kept pace. The Navy's manning needs are unique because of necessary sea-shore rotation demands; on an aggregate basis in the force structure, every two billets added at sea require one billet added ashore to ensure equitable rotation and prevent unduly long sea tours. To maintain adequate manning of ships and aircraft squadrons in a growing fleet despite end strength limitations, we have inadequately manned fleet support and shore activities. This will affect readiness in the long term. It has already led to longer sea tours for critical, sea-intensive ratings. We continue to seek ways to cope with inadequate end-strength, such as civilianization of some shore billets for ratings which are not sea-intensive, but we have cut shore manning as much as it can be cut. If the trend established by FY-82 through FY-86 endstrength constraints continues, the Navy will be some 18,000 people below manning requirements in 1991. We are requesting an active manpower increase of 2.0 percent for FY-87.

Sustainability

Sustainability comprises funding for the Navy's staying power in conflict, principally ordnance and war reserve material. Because our strategy explicitly considers protracted conventional conflict, and because ordnance stocks for protracted conflict have consistently been at the top of Unified CINCs priority lists, Navy's sustainability account has more than doubled its share of the budget, from 4 percent in 1980 to 10 percent today. Real growth in sustainability since 1980 has been 135 percent, almost three times the overall TOA growth rate. Results are now being seen in the substantial numbers of weapons and sonobuoys, appropriated in previous years, now being delivered. Our current request continues this urgently needed recovery.

Modernization

Modernization comprises funding to improve the technological sophistication and capability of current forces and to ensure we develop technologies to meet future needs. It includes all Navy Research, Development, Test and Evaluation (RDT&E), ship modernization, aircraft, sensor and weapon system alterations, and represents some 17 percent of the Navy budget. Modernization has been second only to sustainability in the rate of real growth since 1980, growing by some 80 percent.

Emphasis on modernization reflects the growing capabilities of the threats we must face, both Soviet and non-Soviet. The Soviet Union has a decided numerical advantage in forces. U.S. policy has been to counter by technological superiority and qualitative edge. We are now seeing a strong commitment to qualitative improvement in newer Soviet forces. New Soviet ships, aircraft, and submarines are technologically sophisticated and highly capable, due in large measure to the hemorrhage of Western technology. Non-Soviet threats, such as Libya and North Korea, have also shown steady qualitative equipment improvements.

RDT&E accounts for well over half the modernization request. Our vigorous RDT&E covers a full spectrum ranging from basic research and exploratory development of new ideas, through developmental and engineering progams to testing and evaluation of systems ready for fleet introduction. Major programs include continued emphasis on modernizing our seabased strategic deterrent, particularly development of the TRIDENT II/D-5 submarine-launched ballistic missile, toward a 1989 initial operational capability; continued development and testing of the V-22 OSPREY (formerly JVX) vertical/short takeoff and landing aircraft, toward a planned first buy in FY-89; Aegis weapon system improvements for upgrades of TICONDEROGA class cruisers and for introduction of the DDG-51 ARLEIGH BURKE class guided missile destroyer, with the lead ship to be delivered in 1989; as well as a major upgrade for the A-6 INTRUDER medium attack aircraft.

Battle force ships and aircraft will receive upgraded command, control and communication (C^3) systems essential to integrate the fighting fleet and provide real-time coordination. Because of the complexity of C^3 and the necessity to avoid piecemeal solutions, we have consolidated resources and top-level engineering management of core battle force C^3 systems under the Battle Force Information Program.

A particularly critical program is the R&D effort supporting anti-submarine warfare (ASW), particularly the development of a new attack submarine, the SEAWOLF class (SSN-21). This submarine will represent a quantum improvement over our outstanding LOS ANGELES class. R&D programs now underway will provide the SSN-21 with improved quieting and new sensors, a more effective and integrated combat system, greater firepower, and improved arctic warfare capability. I am confident that the SSN-21 will again put us a decade ahead of comparable Soviet submarines.

Research in oceanography is of special interest to the Navy. Recognizing that we must better understand the oceans in order to exploit them for strategic and tactical advantage, the Secretary of the Navy and I implemented a number of initiatives. These initiatives range from expanding the Navy oceanographer officer community, to modernizing our oceanographic ships and acquiring remote (space-based) sensing capabilities, and reflect our commitment to keep the Navy a principal force in oceanography.

Force Structure

Force structure funding includes appropriations for construction, conversion, and reactivation of ships, and for procurement of aircraft. Numbers and capabilities of our ships and aircraft are the most visible and tangible indication of naval power and total capability. Force structure is the most visible budget component, although it accounts for only about 20 percent of TOA. This year's request represents the minimum necessary to sustain into the 1990's and beyond the balanced 600-ship force which we will achieve in 1989.

Funding for submarines, surface combatants, amphibious and other ships accounts for almost three-quarters of the force structure request. Table 2, the Navy Shipbuilding Plan, shows what that funding buys. We are requesting a 14th OHIO class ballistic missile submarine, and four more LOS ANGELES class submarines to meet our goal of 100 attack submarines. The request also includes five Aegis-equipped surface combatants, 2 TICONDEROGA class cruisers and three ARLEIGH BURKE class destroyers. We are requesting funds for the lead ship of the AOE-6 Fast Combat Support Ship class.

TABLE 2

NAVY FIVE-YEAR SHIP

CONSTRUCTION/CONVERSION PLAN

	FY-87	FY-88	FY-89	FY-90	FY-91
New Construction					
TRIDENT	1	1	1	1	1
SSN-688	4	3	3	4	1
SSN-21	-	-	1	-	2
CG-47	2	2	2	2	-
DDG-51	3	3	3	3	5
LHD-1	-	1	1	-	1
LSD-41 (VARIANT)	-	1	1	1	1
MCM	-	3	-	-	-
MSH	4	4	4	-	-
TAO	2	2	2	2	2
TAGOS	3	3	2	2	-
AE	-	1	-	2	2
AOE-6	1	-	1	1	1
ARS	-	-	-	-	1
AGX/AGOR	1	-	-	2	3
LCAC	-	(9)	(9)	(9)	(9)
TOTAL	21	24	21	20	20
Conversions					
CV SLEP	-	1	-	-	1
LPD-4 SLEP	-	-	1	3	3
AO(JUMBO C)	1	1	1	2	-
TACS(C)	2	2	2	-	-
TOTAL	3	4	4	5	4

Table 3 is our aircraft procurement plan. In FY-87, we request a broad range of aircraft as we build toward an airwing structure needed for a balanced force.

TABLE 3

NAVY FIVE-YEAR AIRCRAFT PROCUREMENT PLAN

	FY-87	FY-88	FY-89	FY-90	FY-91
A-6E/F	11	12	18	24	24
EA-6B	12	12	12	12	12
AV-8B	42	42	42	42	42
F-14	15	12	18	24	36
F/A-18	120	132	132	163	163
CH-53E	14	14	14	12	0
V-22	0	0	18	42	58
SH-60B	17	6	6	6	12
SH-60F	7	18	18	18	12
P-3C	9	9	9	9	9
E-2C	6	6	6	6	6
SH-2F	6				
C-2	9				
T-44A	0	0	0	15	
T-45TS	0	12	24	24	48
UH-60A	0	0	3	3	
E-6A	3	3	3	3	
TOTAL	271	278	323	403	422

THE COURSE AHEAD: MARITIME SECURITY REQUIREMENTS AND OPPORTUNITIES

The Navy's budget for FY-87 is the most concrete expression of my concerns about the present and near future, an honest appraisal of the direction I feel we must travel to sustain recent accomplishments, support national policy and strategy, and maintain a position of maritime superiority. But a budget or a five-year defense plan does not, in itself, provide a vision of the future to guide the Navy over the long term. As President Reagan has reminded us, "We are an island nation." We must maintain maritime strength into the distant future, in face of a menacing continental power fully bent on challenging our claim to the seas, and in face of a growing range of other threats in an era of violent peace.

To meet these requirements, today's decisions must be informed by long range thinking and sound strategic vision. The Navy has a particular requirement to look to the future because of the nature of our force structure. The ships we build today will be in commission well into the 21st century, in some cases 50 years hence. We must look now at maritime security requirements and opportunities that the next century might pose. We have begun such an effort, using maritime strategy as a benchmark.

The maritime strategy is not in itself a long-range plan. It is a comprehensive analysis of our capabilities, the threats we face and the environments in which we operate. It is the basis upon which the many and varied long-range plans within the Navy are developed. Using the precepts of the maritime strategy, the Director of Naval Warfare prepares master plans in each warfare area which look as far forward as possible. Based on warfare master plans and strategies, Navy organizations which sponsor procurement programs develop their master plans, laying out long-range force structure and modernization plans. Thus, our central strategic framework -- maritime strategy -- provides the point of departure and common frame of reference for decentralized, detailed long-range planning.

The results of this planning effort are not simply put on a shelf to gather dust. Plans and strategies are tested constantly in computer models, simulations, and wargames. Perhaps most importantly, they are tested against what we see in real life, at sea.

The Navy budget and FYDP which you see are only the tip of a planning "iceberg," which looks to the future to ensure that today's programs and decisions are solidly based. But, this process is not the full extent of our view of the future. From a broader perspective, we must understand those factors which will shape future maritime strategy, such as major changes in the global stratgegic environment, or in the resources available to us -- people, technology, the economy, demographics, social forces, as well as more specifically military factors. Several of these areas may offer unique opportunities or pose new requirements for U.S. maritime strategy of the next century, and I have initiated special efforts to broaden our understanding of these issues.

Global Environment. If we look back 30 years we see an international situation and principles of naval operations only incrementally different from today's world. However, if we extend our historic horizon back another 20 years, we witness radical discontinuities in the world's political make up and dramatic differences in the way navies operated. The future may well hold similar discontinuities and challenges. The U.S. Navy recognizes that it must lead changes in naval operations. We cannot afford the luxury of reacting to new realities.

The world environment injects a steady stream of new challenges -- oil crises, terrorism, drug abuse. We must understand the impact and interaction of those challenges as they relate to national security, the maritime strategy and the Navy. We must be prepared to respond to them appropriately in support of U.S. national interests. We will continue to make every effort to define those forces which can shape the environment -- and thus our strategy -- of the 21st century.

People. U.S. demographic trends are disturbing in that the total manpower pool available for national service will shrink into the next century. Even more disquieting trends can be seen in the qualitative arena. While elementary and secondary schools are getting back to basics, the Navy has been required to lower the levels of training manuals, and institute remedial reading and other programs to develop skills which should have been learned in school. American youth is not as active or physically fit as in past generations, an issue of concern in time of war, where strength and stamina are vital to mission performance. Societal trends in the U.S. have encouraged youth to think as moral relativists, eschewing the time worn tenets of doing what is right for its own sake.

I believe that a rejuvenation of these three qualities -- intellectual, physical, ethical -- in America's youth is essential, and could overcome the quantitative shortfall the nation's armed services face in the next decade. I am also convinced that this message resonates with the vast majority of Americans, who in turn, are more likely to affiliate with institutions possessing the highest possible standards of personal excellence. For these reasons, the Navy is beginning long-term effort to enhance the general excellence of Navy men and women and to explore how we can support national efforts to increase the overall excellence of American youth. High-quality personnel are a crucial component of our national security. There is no more important challenge.

Sustainability in Extended Conflict. To meet an increasingly sophisticated threat, our weapons have become more sophisticated. This does not obviate the need for large volumes of weapons, sonobuoys, and other sustainability items in the event of a protracted conventional war. The possibility that a war could be protracted is a formidable deterrent to the Soviets who emphasize achieving a quick, decisive victory. Thus, a fundamental precept of the maritime strategy is to ensure that the Soviets face a protracted conflict should they choose to fight.

At present,the only way to ensure sustainability in extended conflict would be to stockpile huge quantities of ordnance. While stockpiling has its place, an affordable and credible military posture for extended conflict requires a radically improved system for ensuring that the industrial base can accommodate wartime requirements smoothly and produce the right kinds of weapons at the proper rate. This system must include cooperation and planning between the public and private sectors in determination of requirements and identification of potential wartime suppliers. It might include stockpiling of only the most sophisticated components in peacetime, using automated production techniques to quickly produce more easily made components closer to the time when needed and then marrying them for use in wartime. Such a system would not only put teeth into our deterrent but would also reduce our stockpiling requirements, thereby saving money in weapons appropriations.

Technology. The Soviet Union poses an increasingly effective threat to our technological superiority. Through open technology transfer, espionage and a dedicated and massive research and development effort, they have made great strides in closing the technology gap. There are even areas where they have established a margin of superiority, such as titanium hulls for submarines.

I am convinced that we can maintain and increase our lead in most important areas of high technology. The key to this effort is the close cooperation of the strategic planning and technology communities. For example, Navy laboratories understand the demands of the maritime strategy and projects assigned to them are directly related to those demands. Our entire national research effort must be provided similar direction and focus, such as that provided by research in strategic defense. Efforts must include the development of essential technologies and the timely transition into improved and more cost-effective systems. Our efforts must be judicious as well as energetic. We must get a clear idea of our requirements, then strenuously avoid the urge to "gold plate." Technological self-discipline not only leads to more improved systems, but also maintains the public trust and consensus.

Naval Warfare Integration. Modern warfare requires integrated, cross-platform, cross-service thinking to adequately deal with increasing complexity and avoid piecemeal solutions. This recognition has already led to important organizational and programmatic changes. For example, we have strengthened the charter of the Director of Naval Warfare to establish integrated naval warfare requirements and operational concepts with emphasis on those areas which transcend individual naval platforms and include such areas as space and information systems. We consolidated responsibility for all electronic warfare programs into a single office under the Director of Naval Warfare, recognizing the impossibility of dealing with electronic warfare requirements on a platform-oriented basis. We recently reconfigured the Naval Electronic Systems Command to the Space and Naval Warfare Systems Command, recognizing the key roles of space-based systems and information architecture. As we move toward the 21st century, technological realities will make these trends even more pronounced. Artificial barriers to truly integrated warfighting have begun to come down, and we will accelerate the process.

Strategic Defense. The Reagan Administration has established a national priority to move from dependence on the destructive capabilities of offensive nuclear weapons toward research on defensive systems. I am optimistic that this research can produce technological breakthroughs which could move us into an era of enhanced security. Navy plays a major role in the conceptual development of strategic defense architecture since the strategic threat emanates from or transits over the world's oceans. We need to understand all the implications on naval warfare of the transition to a world where both superpowers have the capability to use advanced technologies to defend themselves.

These are key issues which will shape the maritime strategy of the future and challenge it to retain its dynamic qualities. I am confident that my tenure as the Chief of Naval Operations is merely one chapter in a maritime book of future strategic successes. Our people and ships are moving at flank speed into the future. Throughout this trip, strategy must remain the framework around which we plan for the future. It is the bedrock of the renaissance of the U.S. Navy today.

CONCLUSION

Throughout the report, I have asked that you measure us against our strategy. It should be apparent that our strategy is sound and dynamic; our accomplishments have been substantial and our requirements are well-founded; and today's decisions and budget requests are but the tip of a planning process that looks toward the future. Because of our progress over the past five years, and our initiatives to reduce costs and increase efficiency, only modest expenditures are required to sustain and keep us on the right course for the future. Working together with our allies and sister Services, the program we have proposed will maintain the maritime superiority, essential to our national security, both now and over the years to come.

The Navy's forward deployed role in protecting our interests will remain crucial in the unstable, often violent environment which confronts us. With your support and that of the American people, the Navy will continue to man the front lines of this violent peace, ready to face the challenges with confidence and spirit born of renewed capability.

COMMANDANT OF THE MARINE CORPS

STATEMENT OF GENERAL KELLEY

PEOPLE PROGRAMS

Senator STEVENS. General Kelley.

General KELLEY. Thank you, Mr. Chairman.

I, too, have submitted a statement for inclusion in the record. I would like to ask your indulgence to make a few brief remarks concerning people which are still our most important priority.

You may note from my posture statement to the Congress that this year may be one of the most optimistic, if not the most optimistic, posture statement that any Commandant has submitted in our 210 year history, I think for justifiable reasons.

Many members of the committee will recall that less than a decade ago the Marine Corps was forced to recommend to the Secretary of Defense an end strength reduction of some 10,000 marines. This was no gold watch. It was a hard, cold reality of life. We had virtually no modernization program; and to maintain readiness, which was our stock in trade, we would have to trade off end strength.

I can promise you, this was a bitter pill; the last thing a marine would want to lose is a fellow marine. As you will note from my posture statement, all of this has dramatically changed.

Today we are a quality force. We are in the process of equipping our quality marines with quality weapons and equipment; and, the quality of our training has never been better at home and abroad.

You will also note from my posture statement we are a manpower intensive corps. In fact, roughly 65 percent of our Marine Corps dollars are dedicated to people. In this regard, we believe today, as we did in 1775, that the individual marine is still the cornerstone of success in combat.

For this reason, let me provide you with a few insights into our active duty manpower. Since 1799 our officer to enlisted ratio has never gone above 1 to 9. Almost 50 percent of our enlisted personnel are lance corporals, pay grade E-3 or below. In 1971, 71 percent of our enlistments were in the 4- to 6-year categories. Today we are exceeding 97 percent in that same category.

In fiscal year 1985 we reached a crossover point. We now have more dependents than active duty marines with some 204,000 dependents currently the responsibility of our corps.

Although the Marines account for some 10 percent of the DOD's total PCS moves, we do it with less than 7 percent of the DOD PCS budget. In fact, our PCS cost is the lowest of all the Services, about one-half the TOE average.

PCS COST SAVINGS

Senator STEVENS. I would like to find out how you do that.

General KELLEY. We will provide that for the record, sir.

[The information follows:]

PERMANENT CHANGE OF STATION

We aggressively manage our PCS program ensuring the most cost effective use of the limited dollars available. Having a younger force helps us keep costs down as does the Unit Deployment Program [UDP] and WESTPAC unaccompanied to accompanied tour conversion. We estimate that UDP saves approximately 11,000 rotational moves annually and this number will increase as more units are added to the program. We expect to convert a total of 5,400 billets from unaccompanied to accompanied in WESTPAC which will also save rotational moves. We are strictly managing the PCS program through an improved assignment system, maximizing tour lengths, minimizing miles traveled per move, and encouraging overseas extensions. The budget before you represents our minimal requirements and contains no excess.

QUALITY OF PERSONNEL

General KELLEY. We have raised the percentage of high school graduates from 70 percent in fiscal year 1977 to 96.8 in fiscal year 1985. Thus far this fiscal year, only 7 of roughly 8,000 non-prior Service accessions are in the lower mental group four category.

What has this brought about? As an example, recently I had a letter from the Commanding General of the Second Force Service Support Group in Camp Lejeune commanding 10,000 marines. At that particular moment, he had 1 marine who was in an unauthorized absentee status out of 10,000. That is the product of quality Marines. It has brought about a marked reduction in our disciplinary rates. As an example, our fiscal year 1985 unauthorized absentee rate was 25 percent of what it was in fiscal year 1977, again, a direct result of quality people.

MANPOWER READINESS

In summary, Mr. Chairman, members of the committee, the manpower readiness of the Marine Corps is now at the highest level we have ever had since we established the All-Volunteer Force. I mention all this merely to emphasize that if our readiness posture is to be continued and our modernization schedule maintained, we need your continued support for our long-term manpower requirements.

People remain our most important product and people remain my highest priority. I can say with no fear of contradiction that the people in our corps are the most effective, efficient and economical force multiplier. For this reason, I urge you to give consideration and approval to our request for a fiscal year 1987 end strength of 200,300.

Let me say in closing, my optimism about the future of the corps is, of course, predicated on congressional approval of the funding level contained in the budget submission.

Thank you, Mr. Chairman.

[The statement of General Kelley follows:]

PREPARED STATEMENT OF GENERAL P. X. KELLEY

COMMANDANT OF THE MARINE CORPS

Mr. Chairman, distinguished members of the Committee:

It is a pleasure for me to report to you on the posture of your Marine Corps. Thanks to congressional support, the Marine Corps is as ready today as it has ever been for worldwide commitment. The Marine Corps readiness is built on quality: (1) Quality people -- the best we have seen; (2) an improved quality of life -- to enhance morale and assist in the retention of our quality people; (3) introduction of the finest weapons and equipment -- to offset quantity with quality; (4) modern strategic deployment and deployment assets -- to ensure global responsiveness and improved reinforcement capabilities; and (5) superb training -- to ensure the effective utilization of our forces.

Our budget reflects a program that provides the maximum defense for each dollar invested. The Marine Corps requires only a small fraction of DOD's funds, yet provides a large share of America's tactical ground and air forces. Your continued support will ensure that your Marine Corps remains this Country's premier Force-in-Readiness, "first to fight."

For the six specific Marine Corps appropriations, we have requested $9.2 billion in Fiscal Year (FY) 1987:

FISCAL YEAR 1987 BUDGET REQUEST

($ IN MILLIONS)

APPROPRIATION TITLE	FY 1986	FY 1987
Military Personnel, Marine Corps	5,196.3	5,333.4
Reserve Personnel, Marine Corps	287.3	314.8
Operation and Maintenance, Marine Corps	1,666.5	1,864.1
Operation and Maintenance, Marine Corps Reserve	58.2	65.3
Procurement, Marine Corps	1,660.8	1,565.0
Marine Corps Stock Fund	37.7	45.9
TOTAL	8,906.8	9,188.5

MANPOWER

Today's Marines are patriotic professionals who came to the Corps eager to serve their country. That these exceptional men and women are reporting to our recruit depots is a testimonial to the outstanding efforts of our dedicated recruiting force. Quality begets quality, as proven again through the attainment of our recruiting goals in FY85.

Our young volunteers are the highest qualified recruits in the Corps' history. The number of recruits with a high school diploma reached an unprecedented 96.8 percent in FY85.

These recruits join a Corps filled with professionals who continue to serve our country with distinction. The quantity of quality enlisted personnel in the force today is the highest we have experienced. Additionally, today's Marines are staying longer, doing more, and doing it more efficiently. I know, because I have seen the pride and professionalism demonstrated in many visits to the field.

Our Marines benefit from conscientious, competent, and mature leadership both in a distinguished body of staff noncommissioned officers (SNCO's) and an officer corps whose quality mirrors that of the force they lead. Our officers lead by example and by practicing a basic philosophy that says, "Marines take care of their own."

A high state of readiness is linked to esprit de corps, among other factors. Higher morale, in turn, is partially dependent upon a sound quality of life.

At the top of the quality of life list is pay -- fair compensation for dedicated and skilled performance. Past congressional support for pay and entitlements has brought about substantial improvements, almost achieving pay comparability with the private sector for the military community through pay raises in FY81 and FY82. This relative pay comparability, however, has since been eroded. The 4 percent pay caps of the three previous years, even though offset by a 3.0 percent pay raise in FY86, have allowed a gap between military and private sector wage levels to grow to 8.3 percent as measured by the Employment Cost Index (ECI). In order to maintain our quality force, it is imperative that military pay be returned to a reasonably comparable level. I ask for your help on this vital issue.

OPERATIONS

The FY87 Operation and Maintenance, Marine Corps (O&MMC) request of $1,864.1 million is intended to accomplish the Marine Corps' top operational priority -- readiness.

The quality recognized in our weapons, equipment, organization, and external lift means, coupled with superb training, prepares the Navy-Marine Corps team for the full spectrum of conflict. The team remains globally deployed to support national policy and is, therefore, able to rapidly respond to international crises when directed by the National Command Authority. Our Marine Ampihibious Forces (MAF) are deployed worldwide. Elements of our II Marine Amphibious Force deploy from the East Coast to the Mediterranean, the North and South Atlantic, the Caribbean, and the North Sea for participation in joint and combined exercises. In addition, a Marine Amphibious Unit is continously on station in the Mediterranean as the Landing Force of the Navy's Sixth Fleet. Based on Okinawa, III Marine Amphibious Force deploys forces in South and Southwest Asia, infantry battalions rotate to Okinawa from the Continental United States as part of the Unit Deployment Program. From the West Coast, I Marine Amphibious Force units train in preparation for commitments, including commitments to the Central Command (CENTCOM). Marine Amphibious Units and Marine Amphibious Brigades have deployed and joined pre-positioning (MPS) Squadron Two ships. The presence of forward-deployed amphibious forces, coupled with rapid deployment of additional forces through the maritime prepositioning program, constitute the most credible elements of deterrence. Potential adversaries have more to consider, and allies have more reassurance. Additionally, Marine aviation forces are deployed with Naval forward-deployed forces in order to enhance Navy-Marine Corps interoperability. An ancillary benefit is derived by providing each Service the opportunity to function in the others' environment.

PROCUREMENT

Procurement funding of $1,565.0 million is requested to help us to remain ready and continue modernization. When you compare the Corps of the mid-to-late 70's with the Corps of today, it is similar to comparing apples with oranges. The reason for such a significant change is simple: the Administration's support and congressional backing.

The modernization of Marine Corps artillery is continuing as scheduled. One artillery battalion in the Reserve Forces was equipped with the M198 during FY85, and the remaining towed battalions will be equipped during FY88/89. Additional self-propelled, 155mm batteries will be activated during the period FY87-89 to improve our general support capability through improved mobility and survivability.

The ability to engage and defeat heavy and light threat armor has also been improved with the addition of some new weapons and improved ammunition. The AT4 has been selected as a replacement for the M72A2 LAW, and the Shoulder-launched Multipurpose Assault Weapon (SMAW), now capable of defeating light armor, will soon be capable of defeating armor up to and including the Soviet T72 tank.

Additionally, 40mm and .50 caliber improved munitions now give us the capability to defeat light armored vehicles. The TOW 2, with its greater range and improved penetration, coupled with the planned product improved Dragon (IOC 90) with increased range, penetration, and improved tracker, complete the array of antiarmor weapons. To improve our night fighting capability, we have fielded a full spectrum of night vision sights and goggles to complement these new weapons.

Our tactical mobility, both ground and air, remains vital. We have increased the capability of our assault amphibians and extended their useful life. We have also embarked on a product improvement program that will further enhance the firepower, mobility, and survivability of the AAV7A1. This product improvement program will enable the AAV7A1 to meet all its operational demands until the follow-on vehicle, the Advanced Assault Amphibian Vehicle (AAAV), is fielded in the late 1990's.

The Light Armored Vehicle (LAV) program is fully underway with the LAV-25 and the Mission Role Vehicles (MRV's) currently being delivered. The MRV's use a common baseline chassis with multiple configurations; e.g, antitank, mortar, recovery, logistics, and command and control. This family of vehicles reduces training and support requirements and improves combat interoperability.

Quality must permeate all aspects of our Corps. As I stated earlier, the quality of the individual Marine is the pre-eminent consideration in the overall quality equation. These Marines must be provided with the finest weapons and equipment, and supported by well-managed logistics that we can afford.

RESERVES

The underlying strength of our sustainability is our Reserve. Charged with providing the capability for rapid force expansion during wartime or national emergency, the Marine Corps Reserve is an integral part of the Marine Corps. Units of the Selected Marine Corps Reserve constitute a full 25 percent of the total peacetime combat power of the Marine Corps. Upon mobilization of the Individual Ready Reserve, this capability rapidly grows to 33 percent of the Marine Corps wartime manpower requirement. In consonance with the Total Force Policy, the Marine Corps Reserve's warfighting assets constitute a significant portion of our total warfighting capability.

NAVY SUPPORT

Our naval surface fire support (NSFS) capability is being dramatically improved with the return of all four IOWA-Class battleships. These battleships' large caliber guns provide a legitimate sense of security for Marines. They are also complementary to landing force artillery after it is established ashore. The introduction of the 5" Semiactive Laser Guided Projectile, plus the development of the improved 16-inch ammunition, will provide the best NSFS that we have enjoyed for some time. Progress in NSFS must continue. In the future, we hope to launch our Marines from over-the-horizon onto beaches and further inland. Adequate range in NSFS is required to support the assault of helicopters and air-cushion craft. These capabilities may generate a need for some NSFS systems with ranges of 60 nautical miles.

One of the Navy's most significant programs for ship-to-shore tactical mobility remains the Landing Craft, Air-Cushion (LCAC). The LCAC will revolutionize our amphibious assault by providing us with a true over-the-horizon launch capability. The LCAC's have only begun to enter the fleet, and we will need at least 90 before we have the number necessary for a meaningful capability.

The tactical mobility of the MV-22 "Osprey" complements similar ground tactical mobility efforts. Our preliminary design phase has been highly successful. Over 6,000 hours of wind tunnel work and extensive design evaluations have allowed us to proceed with full-scale development of a highly refined and cost-effective design. The Osprey will begin replacing the capable, but aging, CH-46's in 1991.

CONCLUSION

In describing the "state" of our Corps, I have attempted to underscore the factors which make it ready for global commitment. Your Marine Corps is ready! It will remain ready because of our investments in quality: quality people, an improved quality of life, the finest weapons and equipment, and superb integrated training.

We shall continue to groom leaders at all levels of command--leaders whose skills are sharpened by professional education; leaders who are taught "how" and not "what" to think. We owe this to those young, bright patriots who daily enter our ranks.

Thanks to your support, Marines' quality of life has improved. Concerted efforts are being made to upgrade facilities and housing, both for the single and married Marines. Emphasis on the family has increased the stability of the home environment; benefitting Marines, their families, and the Corps.

With continued congressional assistance, we will equip your Marines with modern, reliable, state-of-the-art weapons acquired in the most cost-effective manner, and support them with the finest aircraft, artillery, and naval surface fire support in the world.

A well-led, properly equipped Marine is only limited by his or her training. Our innovative training programs and maximum use of realistic training environments ensure that your Marines are prepared for future conflict should the need arise.

My priorities as Commandant have been to perpetuate the quality standards established by my predecessors and to bring stability to the Corps. I want to create the most stable living and working environment that I can for your Marines in this unstable world.

MILITARY PAY INCREASES

Senator STEVENS. Thank you very much, gentlemen. I think we all appreciate what you have done in terms of the moderization period. I do not want my questions to be misinterpreted, so I had the record checked and I find that in the period of time that I have been privileged to be chairman of this subcommittee we have increased military pay by 45 percent.

I am not critical of the job you have done in urging the quality of life concept on the Congress, nor do I think any member of this committee need apologize for its role in terms of securing the funds to meet your requests.

I have to ask you in view of the impact on this budget whether or not the 4-percent pay raise that is involved in this proposal once again is the most effective use that you can make of the limited funds that we will have available this year?

We are going to have a period, as you know, at least it is proposed, of a pay freeze once again for the civilians in the Defense Department, and you have a great many of them. Civil servants in the military have received a 27.9 percent pay raise in the same period that the military has received a 45 percent pay raise.

I would ask you two questions really. One is: Is this the most effective use of your military money and will this increasing disparity between military pay and civilian pay put a strain on the relationships in the Department of Defense between military and civilian employees?

Does anyone have objection if we put the 10-minute rule on everybody, including myself, and recognize the Senators in the order they came to the hearing?

We did that before.

Secretary LEHMAN. Mr. Chairman, I think all of us agree that our highest priority is maintaining our personnel quality and the pay raise is a part of that. I would certainly keep the pay raise as the highest priority along with the other personnel aspects in our budget.

I do not like to prioritize anything in our budget, but one I do prioritize is personnel. We would rather have any cuts that have to be taken to be taken out of R&D and hardware, anywhere else, except personnel. The 4 percent is a tiny bit above projected inflation. We believe that it is essential if we are going to keep this quality.

It is not an invidious comparison with the civilians. The fact is that we do not have the retention problems nor do we have the difficulties of daily life and family separation in our civilian corps that we do in the military.

In the Navy and Marine Corps we lost more than 100 people last year in normal peacetime training. The civilians do not carry that risk. In wartime, of course, that risk is much greater. Nevertheless, our civilians, I believe, particularly at the senior levels, are grossly underpaid, our senior civil service and SES people. Every year the pay cap gets worse and worse as a problem and it is making it more and more difficult to hold and attract first rate people, which is the secret to solving all our management and procurement problems.

So, things are not all well with our civilian personnel. We would like to see much higher compensation available to better people and more flexibility like our China Lake experiment which has been such a success.

But please, do not cut the 4-percent pay raise for the uniformed military, anything but that.

Senator STEVENS. I also serve as Chairman of the Civil Service Subcommittee. I must say I am getting increased comments particularly from representatives of the civil servants who know of my role over here as to how can we justify this increasingly different policy in the treatment of the military and civilian employees. It is something we will have to explore.

I want to make public now a conversation that you and I have had, to tell everyone concerned that this subcommittee is planning a field trip when the *Iowa* approaches somewhere down around the southern waters this spring, where we will hold a John Stennis day.

I have made a commitment that I will eat the crow that I should have eaten when Senator Stennis opposed me as Chairman in three instances since we shifted chairs and it was on the battleships.

We would like to have John Stennis day on your battleship and invite all members of the subcommittee to come down and let him see the product of his wisdom, and you can serve the crow, Mr. Secretary. I will be glad to eat it. [Laughter.]

STRATEGIC SEALIFT

Senator STEVENS. One of the subjects close to my heart is the problem of sealift. I was very disturbed at reports that came to us at the time of the Grenada exercise that we had trouble in locating troop ships.

As we looked into it further, we really do not have the sealift projected for our forces. I have been trying to find a way to get the Congress to react to that need.

Can we look forward to any help this year from the Navy? I know you personally have been able to speak up, Mr. Secretary, and you, too, Admiral Watkins, but officially are you going to be able to give us help in trying to meet the sealift deficit in our projected plans for the needs of the Navy?

Secretary LEHMAN. We have made clear and will renew the vigor of our efforts to get a wider appreciation within the administration and in OMB for the need for making real progress in our strategic sealift requirement.

As you know, I personally have supported, and I think it is a wise allocation of cost savings, the intiative that you put together last year and which has been appropriated. Hopefully, it will be authorized to use these cost savings to begin this Mariner program and hopefully we will see progress in a wider appreciation of that approach.

We have made progress in the RRF, again, thanks to your initiative in providing appropriations, which has enabled, us with just one purchase of $206.6 million to reproduce all the lift contained in the eight SL–7 ships, an excellent initiative.

Taking advantage of the buyer's market, we have picked up 13 good modern ships that can be ready to sail in just 5 days and lift an entire Army division with all of its equipment. That was done with just $206.6 million. We appreciate your initiative and help in getting that through.

Senator STEVENS. I am pleased with that. I think the subcommittee is pleased with that. The problem is that those ships are not manned, they are not subject to management. They are not out where you can pick them up in a short period of time, a maximum of 72 hours.

It would take weeks to put them into service. It is costing us $100 million to keep them tied to the docks. It just does not make sense to me to have our merchant marine going downhill and the Navy sealift tied up at the dock which is not usable as a national policy.

Somehow or other we have to have a breakthrough at OMB or it will continue. I believe it is wasteful to spend $100 million a year to just mothball ships when for less than that over a period of 15 years we can maintain the MARAD program and have manned ships with active management in the civilian economy ready to support the sealift on short notice.

Somehow or other, it has to happen. This is not parochial. I do not have any shipbuilding capacity in Alaska, as you know. I just believe this is one of the greatest deficits in our national military planning, the lack of sealift readily available.

I hope somehow we can get that through to the people who are crunching numbers, I might have some help from budget crunchers I know.

TRIDENT

The last comment to you, Admiral, is about the Trident. Because of the commissioning of the USS *Alaska*, I have become very interested in the Trident and recently visited with the British about their Trident program..

I note you have some recommendations that have come to us now from the CBO about the Trident test program. They recommend that you reduce the Trident test missiles by 105 and save $4.1 billion while still meeting the JCS requirements.

I have to ask you, despite my firm support for the program, what is wrong with that recommendation?

Secretary LEHMAN. Mr. Chairman, as part of the reduction to meet the President's agreement of 0–3–3 and then the Gramm-Rudman 1986 hits, the cuts that were taken in the Trident D–5 program included economies that reduced the number of missiles to be bought in the first 4 years of production.

That is based on a hope that we will have better production failure rates than we had in the C–4 program. If we have more than two failed missiles from the first production lot, missiles that do not pass production quality control tests, then we will have a reduced number of operational missiles that would be available for the initial operational cruise.

What this means is that if things go well, and [deleted] we will have a full 24 missiles on the first cruise. [Deleted.]

Having already reduced the production missile buy through 1990 to the minimum necessary to achieve shipfill, as a result of cost saving actions during our preparation of the fiscal year 1987 budget, any further reductions, such as those proposed in the CBO study, would not be possible before 1991.

Senator STEVENS. What you are really saying is as part of the Gramm-Rudman sequestering you are going to put a hit on those missiles?

Secretary LEHMAN. Not entirely Gramm-Rudman, but as part of the necessity to reduce the budget to the lower base of the agreement last summer, the 0–3–3 formula and Gramm-Rudman is on top of that for 1986.

Senator STEVENS. We have not seen those numbers. I look forward to seeing them. Thank you very much.

Senator Rudman.

POSITION OF DEFENSE BUDGET UNDER GRH

Senator RUDMAN. Mr. Secretary, Admiral Watkins, and General Kelley, we are delighted to have you here again. Let me say at the outset, as I said to the Secretary of the Air Force yesterday, and I will say to the Secretary of the Army and Chief of Staff of the Army when they appear before us next week, that the three U.S. Senators sponsoring the Gramm-Rudman-Hollings bill, are probably in the forefront during the last 5 years in supporting defense and would like to continue.

Unfortunately, most people take the short view. The gentlemen sitting to the right and left of the Secretary have served over a period of time, and they have seen the results of massive cutbacks in defense budgets for the wrong reasons. I will simply say to you that the purpose of this bill is to put realism in budgeting. If the economy does what economists say it will, and the deficit grows to $200 billion-plus and higher, the interest will devour more than half the income tax receipts and, judging from history, the first victim will be the defense budget.

So, I hope you understand that those of us who support your programs do so because we believe we need more realism in budgeting. Having said that, I have very few questions.

I have looked at your submissions and am generally supportive of what you want to do. I recognize the Navy and Marine Corps have led the way in trying to have restraint in procurements and manpower.

Nonetheless, I want to ask a couple questions of the Secretary and the Commandant.

OVERRUNS ON REPAIR AND MAINTENANCE

Mr. Secretary, I think this is probably old news, but there was a GAO report which I believe the Navy agrees with—that indicated several years ago there were some rather substantial overruns on what were supposed to be fixed-price contracts on repair and maintenance.

It ran from one billion to one billion five or six, four to $500 million overrun which I understand was not caused by overrunning the original specifications, but by a number of changes along the way.

So, as opposed to the original calculations, repairs and maintenance costs grew by 50 percent. Has this problem been addressed? One of the most important parts of readiness is to keep up the maintainability programs.

Secretary LEHMAN. Yes, it has been one of the toughest management problems I have had to wrestle with over the last 5 years. There is no easy formula for solution. They were not really fixed-price contracts, the 96 contracts mentioned in that GAO report. It was a very accurate report and fairly described the situation.

The contracts were awarded in a way where price was one of five factors, but they were not, in any way, fixed price awards. So, it invited buy-ins. It invited people to put an unrealistically low price in and get well on the "open and inspect work" and the changes in the work package.

We have attempted to develop and I think have now found a formula that by no means completely solves the problem, I think, but will cut it in half. What we do now is fix price a base package for a given ship class. That base package of work we know has to be done, can be fixed price and competitively awarded.

But then there is still the "open and inspect work." Until you open up a pump or a turbine, you do not know how much work you have to do. There is no way to fix the price of that work in advance. That kind of work and ship modifications, which are a separate part of the overhaul problem will be dealt with in a separate package. That package, in effect will have to be cost plus to a certain extent, but, we think we can halve the problem.

We are never going to solve it completely because of the inability to accurately estimate precisely the time and materials needed in a repair job. It is further complicated by the fact that we have so overly concentrated the fleet relative to the number of homeports we have that we find ourselves facing monopolies or oligopolies in a large part of our repair process.

What we have been trying to do is broaden the homeport areas and compete overhauls in a way we have never done before. That is beginning to show real success. But dispersing the 130 ships added to reach the 600-ship Navy by going into areas like Puget Sound which has a good industrial base and into the Gulf ports, and into New York, we will draw on a wider competitive industrial base which will help again to reduce the problem. But, I fear we are never going to get rid of it completely.

INCREASED SYSTEMS COMPETITION

Senator RUDMAN. Let me go to another subject. We have sometimes been criticized for the Navy's long dedication to getting more and more competition in a number of areas, but there must be a good reason for it. I am puzzled, however, with your decision to go ahead with Harm of block four rather than wait a bit for the low cost Seeker developed successfully at China Lake for, I believe, 60 percent of the Harm cost.

Secretary LEHMAN. I lost that battle 3 years ago, as you recall. We pushed very hard to get second sourcing for the Harm missile, but we failed to get it. So, we are not intending to compete or second source the Harm missile at this point until we get the low cost Seeker that is being developed at China Lake.

BIDDING ON SEEKER MISSILE

Senator RUDMAN. When do you expect it will be ready for bidding?

Secretary LEHMAN. I will have to provide that for the record because we are looking now at three versions of the low-cost Seeker for different size missiles. It is possible that we may go straight to a Sparrow-size missile. I will provide those numbers for the record.

LOW COST SEEKER

The current LCS Program is structured to allow Initial Operational Capability [IOC] [deleted] Major Milestones for the program are as follows:

Release to engineering models—Jan 86 (complete)
Release to pre-production prototypes—[deleted]
Release to low-rate initial production [deleted]
Approval for limited production—[deleted]
Approval for full production—[deleted]

PERSONNEL SUPPORT AND LOGISTICS

Senator RUDMAN. General Kelley, I really have just one question for you and I want you to understand it is not meant as criticism. I am only trying to elicit information.

After reading a very old book by Hollings Smith on Marine Corps organization during World War II, I noted that the role of the corps has not changed very much, although the methods have changed.

I was looking into the Marine Corps organization the other day. I want you to answer a question. You know of my interest in personnel support and logistics. You have currently, I believe, nine infantry regiments with global commitments. Above those regiments you have the normal three division headquarters. In addition, you have six marine amphibious brigade headquarters, five marine amphibious unit headquarters, and three marine amphibious headquarters.

I was surprised to find this many headquarters for nine combat regiments. Maybe the answer is mobilization, but although I think it should be easy to supply the number of people in those headquarters, why so many for these nine regiments, or am I missing something?

General KELLEY. You are not missing anything at all. The fact that the headquarters are there is quite obvious. You will find very little redundancy in headquarters. Marine Amphibious Force, Marine Amphibious Brigade and Marine Amphibious Unit are our organizations we put together using a building block concept.

In many cases we do pull people from those other headquarters.

Those are organizational headquarters for combat when we organize the Marine Air-Ground Task Forces. They become the connectivity between the air and the ground combat elements.

As you recall, when you go into the legislative history of the Congress long-standing legislation has provided for the combined arms team of air and ground. So, those headquarters, for instance, a regimental headquarters of which we have nine would also be the regimental headquarters of a Marine Amphibious Brigade.

I understand your question. It is a good question. We can provide those figures for the record.

Senator RUDMAN. I would appreciate it if you would.

MAGTF Headquarters

Prior to 1983, MAGTF headquarters were formed on an ad hoc basis for specific missions, exercises and deployments. The MAGTF headquarters is charged with the operational control of its subordinate elements; the Ground Combat Element, the Air Combat Element and the Combat Service Support Element. To effectively control, employ and integrate those diverse elements, a functionally balanced and well-trained headquarters is required. The ad hoc temporary approach previously taken was not the optimum solution. A lack of standardization, constant retraining of personnel and a drawdown of key personnel from the operating forces led to inefficiencies both within the task organized headquarters and the organization that suffered temporary personnel loss. To solve the problems encountered, the Marine Corps in 1983 decided to establish permanent, standardized headquarters for its MAGTFs. The Commandant's decision provided for three MAF (nucleus) headquarters and six MAB headquarters. Each of these headquarters are oriented to specific regional contingency plans.

The MAGTF headquarters are separate and distinct from other operational headquarters within the Division, Wing, or Force Services Support Group. The MAF is built around a Ground Combat Element of one or more divisions. A MAB is built around a Ground Combat Element of one or more regiments. The three MAFs are, in effect, operational headquarters for the existing Divisions, Wings and FSSG's. The six MABs have a variety of functions, with three MABs keying on forcible entry amphibious operations and the remaining three focusing on the unique requirements associated with Maritime Pre-positioning.

In 1985 we recognized the need for permanent headquarters to support our standing commitment for forward deployments afloat. Five MAU headquarters were therefore established.

While MAB and MAU headquarters are established and manned as fully operational MAGTF headquarters, MAF headquarters are to be established only as nucleus organizations in peacetime. The concept calls for a "building block" relationship between a MAF (nucleus) and a MAB headquarters, meaning that there will be a marriage of the two whenever a fully operational MAF headquarters is to be established. Each MAF (nucleus) headquarters will provide the expertise for planning MAF size operations and will also train to be the core of a fully operational MAF headquarters. Meanwhile, each MAB headquarters, when fully structured and manned, will exercise and prepare for rapid deployments, either independently or as part of a MAF. MAU headquarters, which do not have a building block relationship with other MAGTF headquarters, devote their time to preparing for and executing required forward deployments in the western Pacific and Mediterranian. The deployments are rotated among the MAU headquarters. Additional MAU headquarters, other than these five permanent ones, will continue to be formed ad hoc, as required.

An evaluation of existing headquarters within the operating forces is underway. The roles, missions, and functions of headquarters from the Group/Regiment level and up are being examined in detail to streamline the functioning of these headquarters. This evaluation is expected to be complete by mid-summer. Adjustments to organizational headquarters elements will be made as appropriate. Current MAGTF Headquarters Table of Organization (T/O) strengths are:

Organization	Off/Enlisted	Total
MAF (nucleus)(3)	59/127	177/381
MAB (6)	51/117	306/702
MAU (5)	13/24	65/120

DECLINE IN MARINE INFANTRY BATTALIONS

Senator RUDMAN. I was also looking at the marine organization because I happen to believe it is the kind of organization, that will play the biggest role in the threat scenarios I believe we may face.

Will you explain to me why these marine infantry battalions have declined from 1,144 troops to only 867?

General KELLEY. It is going up. Simply stated when we made the decision to go down in size to the smaller infantry battalion, it was not driven really by any strong tactical considerations. It was driven by the fact that we had allowed our combat service support elements to dwindle down to a level of effectiveness that we felt would not be effective in combat.

So, we siphoned off people from the infantry battalions to build up the other leg of the stool, combat service support.

Senator RUDMAN. Direct support?

General KELLEY. Combat service support, logistics units, engineer units, and communications units. So, we siphoned off manpower at the time. In my opinion, we made one critical error. We took the 13-man squad, which had been a historically, traditionally, the first echelon in which we fire and maneuver simultaneously, and we shuttled that down to an 11-man squad which gave us far less effective tactics.

That is part of the request. We are asking to get back to that 13-man squad.

Senator RUDMAN. I assume there are automatic weapons in the fire element.

General KELLEY. Indeed, there will be. One thing more, the poor guy is going to have to carry all that stuff.

Senator STEVENS. Senator Sasser.

Senator **Sasser**. Thank you, Mr. Chairman.

MILLINGTON, TN, NAVY HOSPITAL

Mr. Secretary, let me begin by asking you about a matter that you and I have discussed previously and that concerns the future of the Navy hospital in Millington, TN. It is a matter of vital interest to me and of vital interest to the naval personnel that serve at the Millington Base.

When we discussed this some days ago, some weeks ago now, you assured me that any planned reduction in force was being suspended at Millington pending completion of a study of the overall Navy medical requirements.

There are problems in Navy medicine, problems in military medicine generally, that I have been concerned about and I think you have also.

I am pleased to see that the Department of Defense is moving to try to correct some of what I perceive to be deficiencies in military medicine and naval medicine also. I was distressed last Friday to receive a copy of the base structure report for fiscal year 1987 and somewhat astonished to read that the report assumes the elimination of 117 civilian jobs at the Millington Hospital.

Now, we immediately ran that through the Navy liaison office here and it has been a week and we have received no response from them, which is surprising in view of the fact we have gotten better cooperation out of the Navy Liaison Office in recent years, in recent months, than we have gotten in prior times.

PERSONNEL REDUCTIONS AT MILLINGTON HOSPITAL

So, my question to you, Mr. Secretary, is: Has this action for any reduction at Millington Naval Hospital been suspended or has the Navy already made the decision to eliminate these jobs at Millington as the base structure report seems to indicate?

Secretary **Lehman**. Senator, there has been no change since I talked to you several weeks ago. We are undergoing a major restructuring of our Navy medicine career paths. We do have very real problems in certain areas and new requirements that we have been added for forward deployed forces, field hospitals, and so forth.

We are in the midst of trying to reallocate our people and yet still provide for dependent care in the United States even as we have to increase the support of the deployed forces. I have not seen the study of which you speak, and that does not surprise me, but the reality is that there is a complete suspension while we look at this. There is no decision to make any reductions at Millington.

You can be sure that we will have full discussions with you and with the entire delegation before any final decision is made. So, rest assured, there will be no budgeting decisions to carry out any reductions until a policy decision is made, a decision you will be kept completely current on and your views will play an active role in making.

As for the response, I will see that you have one for the record.

Senator SASSER. Thank you, Mr. Secretary.

Whoever put out this base structure report showing reduction of 117 civilian employees in Millington as part of the 2 percent did not get the word on this.

Secretary LEHMAN. Someone must have stolen their stationery. [Laughter.]

[The information follows:]

NAVAL HOSPITAL, MILLINGTON

The information compiled for the fiscal year 1987 Base Structure Annex does not reflect a true picture of civilian employment at Naval Hospital, Millington. A correction for that submission has been initiated. The corrected information does not display a reduction, but an increase in the number of civilian employees to a total of 119.

BASE SAFETY AND SECURITY

Senator SASSER. Mr. Secretary, I have been concerned for some time about the safety and security of our bases. I become concerned about this by virtue of service as ranking member of the Military Construction Subcommittee to a point of sending a staff member to inspect those bases for security purposes this past summer.

We saw what we thought were some glaring security defects in perimeter security and felt that the Philippine Government was not carrying out its commitment to provide the proper security for these bases. Since then we have seen a growing destabilization in the Philippine Islands.

The National People's Army is growing now by a geometric ratio. It is in the public domain that now it numbers somewhere in the neighborhood of 20,000 with perhaps another 15 or 20,000 sympathizers who are partially armed and partially active. This is an insurgency that is fueled internally with no discernible external support for it.

IMPORTANCE OF SUBIC NAVAL AND CLARK AIR BASES IN PHILIPPINES

I would like to ask you and perhaps Admiral Watkins, in your view, just how critical is the Subic Naval Base to U.S. interests in the Philippine region. I perceive Subic might be more difficult to replace, for example, than Clark Air Base.

Let me follow on with another question. Some weeks ago at my initiative we placed in the Military Construction report a direction directing the Department of Defense to undertake studies for alternative bases for both Clark and Subic.

So, my question to you is: No. 1, how important is Subic Naval Base to U.S. interests in that part of the world, and No. 2, is the Navy presently planning alternatives or are there contingency plans underway in the event, and I think unlikely event, but not something that we can exclude, that we should lose Subic Naval Base?

Secretary LEHMAN. Admiral Watkins was Commander of the Pacific Fleet. I would like to ask him to address the military aspects of that question which are the key aspects. However, let me say, that from a geopolitical point of view, we do not believe that there is any alternative to Subic. It is rather like the very telling point that the Chairman made with regard to sealift.

Yes, a poor substitute for having an essential merchant fleet is to have a mothballed merchant fleet, which is what we have. But that is not a real substitute. It is not an alternative.

Similarly, while we could move certain facilities to other places like Guam and Tinian, we have surveyed those sites and know what that entails, and it is very expensive. Nevertheless, we could do that. But, to allow people to think that that is in fact an alternative is wrong. It is not an alternative. It is something different.

Admiral Watkins can give you more.

Senator STEVENS. Would the Senator yield?

Senator SASSER. I will be glad to yield to the chairman.

OPPOSITION TO ABANDONING PHILIPPINES NAVAL AND AIR BASES

Senator STEVENS. I think this report coming March 1 is most important. I hope that the Department of Defense would get it here quickly because it is some people's thinking that in relation to President Marcos, we would close Clark and Subic Bay. We have not closed Guantanamo. I, for one, am going to oppose any attempt to abandon those facilities and abandon the investment we have made there.

Everybody ought to remember Guantanamo in this discussion. That whole situation could fall apart and we are entitled to our lease being lived up to for both facilities. I hope people will listen to us.

This report that the Military Construction Subcommittee requested will help us, I think, demonstrate what the total cost of reproducing those facilities would be today. To have people come up with the idea, let us abandon them over there and teach Marcos a lesson is shortsighted.

I would urge you to get a report so that we can prove by those statistics what it would cost to replace the very essential facilities for the Department of Defense. I thank the gentlemen.

Admiral WATKINS. I could not agree with you more on those comments. The Unified Commander in the Pacific has done some alternative studies. They have been submitted to the Department of Defense. If you just talk dollars, you are talking $8 to $10 billion minimum, but that is not the critical issue.

Senator SASSER. This is for Subic?

Admiral WATKINS. That is for the Subic Bay complex and Clark Airfield. But that is not the issue. The issue is that we would have a whole new strategic picture in that part of the world. You are talking about, at best, alternative sites 500 miles away from the South China Sea, a flowpoint through which virtually all sea traffic flows from Australia to Japan, from the Mideast to the United States, and from the Mideast to Japan, all pass through that region.

SOVIET BASING AT CAM RANH BAY

The Soviets now have a major footprint in Cam Ranh Bay. In fact, just the other day a regiment of naval infantry was barracked there. There are now on the ground, in place, about 40 tactical aircraft of all types including Floggers and long-range reconnaissance antisubmarine warfare aircraft, nuclear submarines, repair vessels, and large base complexes. All in one of the finest ports ever built by the United States.

This is a very significant strategic change in the Soviet posture. This is the largest forward deployed base that the Soviets have anywhere in the world. So, we really do not have any strategic option but to stay in the region. Therefore, I think it is strategicially irresponsible to talk casually about moving out of the region. We have to do whatever is necessary to remain in the region and we should be thinking in those terms, not thinking casually of alternatives. Even if you were to come up with the eight to $10 billion, that is not going to answer the needs for the region.

The United States would be letting down the ASEAN nations that count desperately on our permanent presence there. Thailand, for example, is the last domino to fall. So, it is a very, very important issue. I would hope we could tamp down the casual rhetoric about moving out of there. What we have to do is to ensure that we remain in the Philippines. The other efforts now underway to try to bring some stability there is another matter and that is where our focus should be. But at this point we should not talk casually about moving these bases.

ESTABLISHED SECURITY IN PHILIPPINE REGION

Security is a very big issue. The Commander-in-Chief, Pacific, has recommended measures that he feels are necessary right now, and we have put those into effect. We should always remember that we have Marines there in the Subic area at all times. They are in training and they work there. They are a major part of our physical security force.

We do not see insurgents as an immediate threat, although we are concerned about it. We watch constantly. We have put additional physical security resources in the region. We feel we are in fairly good shape right now. In addition, we have set up our operational ship patterns so that we are generally at sea in the region. The Midway Battle Group and the Marine Amphibious Ready Group are in position today. We do watch things carefully.

In the Navy budget alone in physical security, primarily focused on overseas bases, we have doubled the funds this year in 1987 over last year's budget. These funds are now $112 million and going up very rapidly, with $915 million over a 5-year program to deal with a worldwide threat. The funds are almost focused on our overseas forward bases. We are very conscious of these issues. Although tangential to the issue of moving out of the base, it is related to it in the other context of physical security.

Our thrust is to stay there, to do what we have to do to stay in the region and to support our friends and allies. We must be very cautious before we talk casually about moving out.

ALTERNATIVE TO PHILIPPINE BASES

Senator SASSER. I agree with Admiral Watkins and I agree with the Chairman. I do not think we should talk casually about abandoning Subic Naval Base or Clark Airfield. Clearly there is no alternative in that region of the world that will be as satisfactory as Subic. It is less clear with regard to Clark. But it is very clear with regard to Subic. By the same token, I think we ought to not get in the posture of saying, never, never, never, never.

There ought to be and I hope there is some contingency plans going on at DOD in the event our posture there should become untenable. I do not think it should be allowed to deteriorate to that condition.

Admiral WATKINS. We have always negotiated our Micronesian Treaty in that regard. There is always an open door for the national security aspect in favor of the United States. I am talking about the Palau, Tinian, Saipan, Guam region as an alternative.

We have been talking about that region for many, many years. In all the negotiations in that part of the world, those portions of the treaty which address national security allow that kind of contingency to be included. We do have the funding stream prepared for that alternative. But it is the kind of alternative you do not like to lay on the table because of its implications. Perhaps you agree with it and you think it is a rational alternative. I happen to think it is not a rational alternative, I want to make that clear.

Senator STEVENS. I want to make it clear I certainly concur with the statement made by the Admiral. We have to have an alternative policy. I just do not see any concept involved in the current relationship with the Philippines which would warrant a mandate just on the spur of the moment with the tremendous investment we have there.

I hope, Mr. Secretary and Admiral, we can schedule a hearing very soon. We are having questions all over the Senate about this. If we can arrange it, we will set next Tuesday or Wednesday and have a hearing so that anyone who wants to understand the relationship of the Philippines to defense policy can come and listen. We will get in touch with you about that.

I think it would be very timely to explore that and set the record straight right now that this is not something to throw away as a gesture of dissatisfaction with the electoral process in the Philippines.

Senator D'Amato.

PREPARED STATEMENT

Senator D'AMATO. Thank you, Mr. Chairman. It is always good to see Secretary Lehman and my good friends, Admiral Watkins and General Kelley.

I would ask that my prepared statement be placed in the record, Mr. Chairman.

PREPARED STATEMENT OF ALFONSE D'AMATO

U.S. SENATOR FROM NEW YORK

Mr. Chairman, I would like to welcome Secretary Lehman, Admiral Watkins, and General P.X. Kelly to this hearing.

Today we have the second in a series of hearings on the administration's proposed fiscal year 1987 Defense budget. The Navy and the Marine Corps have played a major role in modernizing our defense posture since President Reagan's election. Mr. Lehman has skillfully guided the Navy through this difficult period of expansion and change. In 5 short years, he has been very successful.

For fiscal year 1987, the Navy and Marine Corps have requested $104.5 billion in budget authority, an increase of over $10 billion from the $94.4 billion we provided for fiscal year 1986. I believe it is important to have a strong Navy and a strong Marine Corps.

Unfortunately, the huge budget deficit and the new Gramm-Rudman-Hollings deficit reduction legislation may have a negative effect on Navy-Marine Corps readiness. It is my hope that the sequestration process will not have to be activated. I have been and continue to be, a supporter of strengthening our naval power by increasing the number and quality of our naval vessels. Although the 600-ship goal is criticized by some, we must remember that, in 1964, we had 917 active ships. By the late 1970's, the Navy's strength had fallen below 500 ships.

I am also a strong supporter of Secretary Lehman's Strategic Homeporting plan. My State has worked hard and has competed fiercely to have the Surface Active Group with the Battleship *Iowa* stationed at Staten Island. I commend Secretary Lehman for a fine choice. Little did we know at the time that it would be only one in a series of battles.

The struggle over Strategic Homeporting is not yet won. Early next month, Mr. Secretary, the Navy will go before Senator Thurmond's Subcommittee on Military construction to justify your Strategic Homeporting program. It is vitally important that your people fully satisfy that committee's concerns. We in congress have received draft copies of the General Accounting report on homeporting and, as you are aware, it is not positive. GAO questions the cost estimates and the strastegic value of homeporting. The Navy needs to address these issues fully before the Armed Services Committee. The Strategic Homeporting concept is sound and supportable. We have come too far, Mr. Secretary, to allow homeporting to be defeated now.

One of the most impressive areas within the Soviet arms buildup is the dramatic growth of its naval forces. The Soviet Navy is the largest in the world. In 1983, the Soviet Union had over 2,500 active ships compared to just 523 ships for the United States. Our ships are threatened by 275 Soviet attack submarines. Soviet Naval power is becoming one of the greatest challenges we face.

I am confident, however, that we can more than meet that challenge. I look forward to working with you, Mr. Secretary, and with General Kelly as we complete the Navy's strategic modernization program.

Thank you, Mr. Chairman.

HOMEPORTING IN NEW YORK

Senator D'AMATO. Moving our discussion from Subic Bay to the Port of New York, Senator Kasten says we do not want to give up homeporting in New York. I know that GAO has a draft report in which they recommend triple berthing for some ships in existing homeports.

I am wondering if the Admiral or Secretary Lehman might want to comment on the advantages or disadvantages of triple berthing.

Secretary LEHMAN. I think we both would like to because it entails a great deal of vulnerability. We are now providing comments to the preliminary draft report.

Essentially, there are no surprises. We estimate, and the GAO seems to confirm, that over the next 15 years, it will cost perhaps $200 million more in investment to disperse the fleet than to triple berth them in existing homeports. That $200 million is money very well spent.

We live today in an age where the Soviets now have a fleet which is deployed off our shores with the ability to mine and to fire conventional cruise missiles. That gives an element of vulnerability to triple berthed and closely packed ports that was not there some years ago.

We did have Norfolk Harbor mined by the Germans in World War II. That created considerable delays and complications. Today, the Soviets have many, many times the mine laying capability that the Germans had then. Now, that does not mean that we do not have the capability to clear those mines. But, there is a question of days and possibly weeks of delay.

It is a question of vulnerability which is a serious one and dispersing the fleet is a major answer to it. There is another major advantage and that is the saving of the industrial base in this country and the water fronts that are in a critical stage.

Another side of the coin that the Chairman talked about, the disappearance of our merchant fleet, is the disappearance of the industrial base which supports maritime activity, the ship repairers and the ship fitters that support the service industries that support both the combatant and merchant ship industry.

We want to disperse to take advantage of and to stabilize a broader mobilization base and to take advantage of a more competitive environment for the services that our fleet requires. So, we think that it is a very modest investment compared to triple berthing. It buys us a great deal more military invulnerability and provides a much healthier industrial base and a more competitive environment.

So, we cannot wait to get to the Big Apple.

Senator D'AMATO. Wonderful. We cannot wait to have you there.

Admiral?

HOMEPORTING COSTS

Admiral WATKINS. I was going to point out in support of what the Secretary said, the total cost for jamming all the ships into existing homeports is about $650 million. From the various States that have participated with us in the new homeporting plans we have received pledges, as you know, of about $150 million. That takes you up to $800 million, $200 million more of the delta between the process of putting them in existing ports and in the new strategic dispersal areas we think is well worth the dollars. We think this plan is a tremendous contribution to the industrial base so vital to us in wartime. It is absolutely critical.

NAVAL COMPLEXES

So, we have planned complexes in general terms in New York, Norfolk, and Charleston-Mayport on the East Coast; Pensacola-Mobile-Pascagoula complex for a carrier battle groups; and a battleship battle group in the Corpus Christi-Houston-Galveston complex on the southern coast; and three complexes on the west coast at Everett, Washington, San Francisco and Long Beach-San Diego area.

At the end of this year we will have seven Trident submarines working out of Bangor with no naval combat forces to protect them. I think that is wrong for the country, wrong strategically, even though we recognize it is not cost effective to put ships in a variety of new ports.

Consider the prospect of having one port in the Nation and putting everybody there. No sea-shore rotation, no PCS, it would all work out. Take it then to the other limit where you are putting eight complexes around this Nation's large littoral, thereby putting ships in areas where we can have an industrial base. We can package up these ships in Battle Groups that will train together, fight together, and live together.

This is optimal from the Navy's point of view. This is the way I have also looked at this thing. The fact that it is of political interest is helpful to get the project going. But that is not the driving factor. The driving factor is to set up this Navy to have access to critical regions.

Everett, WA, is closest to the Soviet Union. The Soviet Union operates their submarines right off our coast. In the Gulf of Alaska region we have no forces to routinely deal with them. In San Francisco we have all our logisitcal support forces and two aircraft carriers, with no escorts. This might have been acceptable when people were not that concerned about the kind of warfighting integrity we needed.

We are trying to bring that aspect into balance now. The forces that are in a particular region can stay there and train together, because today we are in port a great deal. We have to be in port about 50 percent of the time. We can use the imbedded computers you purchased and encouraged us to use for training in our homeports. We can integrate that training, with the Battle Groups and carriers working together. We think the concept is a solid one. From my point of view it is militarily sound. I think the $200 million delta to the nearly billion dollars it is going to cost anyway is worthwhile.

Senator D'AMATO. Thank you very much.

Mr. Chairman, I think if we were to take this record and send it over to Armed Services and Senator Thurmond, maybe he would feel it will not be necessary to hold that hearing next month, but take the benefit of this committee's work.

Thank you, Mr. Chairman.

Senator STEVENS. Senator Proxmire.

NAVAL REDUCTIONS TO MEET GRH CUTS

Senator PROXMIRE. I am going to ask you the same question I asked the Air Force yesterday. If the sequester order goes into effect for fiscal year 1987, the Department of Defense may have to cut $49 billion in budget authority.

That means the Navy share of that cut will be over $15 billion. I would like to know what you would cut to achieve the $15 billion reduction. I would like you to be as specific as you can.

Secretary LEHMAN. As you know, we have very little discretion under Gramm-Rudman so we would cut everything. Every Program Element line would be cut by the same percentage. The results would be utter chaos. It would drive waste and chaos into our contracting to such a degree that it is hard to contemplate.

I would have to go back, with hat in hand, to every contractor, and reopen every fixed-price contract that we have negotiated and try to get the best terms that in their generosity they might grant to us, because it will be we who are breaking our contractual relationship.

EFFECT OF REDUCTIONS ON PERSONNEL

Senator PROXMIRE. What is the effect on personnel?

Secretary LEHMAN. The effect will be lay-offs of people immediately and reductions across the board because we have to take it out of each account on an across-the-board basis.

Senator PROXMIRE. Would you say it would significantly diminish our national security?

Secretary LEHMAN. Diminish is far too mild a term. It would bring an incredible confusion and chaos to every account.

REDUCTION IN HEADQUARTERS STAFF

Senator PROXMIRE. Mr. Secretary, a few months ago you made a fine statement deploring the tremendous growth in headquarters personnel in the Office of the Deputy of Defense, Office of the Secretary of the Army, Secretary of the Air Force, and Secretary of the Navy. I thought it was an excellent statement. I have used it many times in speeches quoting a real authority.

Why cannot you reduce by 80 or 90 percent the personnel in your office?

Secretary LEHMAN. We have put our money where our mouth is in the last year. We have reduced our headquarters staff in the Navy Department within the Washington area by more than 1,000 billets. We did away with the entire Navy Materiel Command. We did away with the three star and four star billets, the other flag billets and another 650 billets involved.

We took 200 of those 650 billets and put them under the three major systems commands. Then we found that we were able to eliminate 600 additional billets, net, from the three systems commands, those people who spent all their time dealing with the other layers of bureaucracy. So we did away with them.

We now have had a net reduction of 1,000 headquarters people in the Washington area. We think, that if Congress will step up to the same problem, because you in Congress drive a lot of the workload that these bureaucrats deal with, if you will step up to an equal percentage, we can make considerable further reductions in all of the elements of the bureaucracy, and I mean major reductions, not just token reductions.

Senator PROXMIRE. Can you tell me how much in percentage reduction 1,000 represents? How many did you have then and how many do you have now?

Secretary LEHMAN. Across the board that represents one-sixth of the headquarters staffs that were involved in material acquisition.

SIZE OF OFFICE OF SECRETARY OF THE NAVY

Senator PROXMIRE. What was the size of the Secretary of the Navy's office right after World War II?

Secretary LEHMAN. I will be happy to provide the numbers. In fact, I will get it to you this afternoon. We are considerably smaller now than we were at the end of World War II. We have had a net 25-percent decrease in the Department of the Navy headquarters over just the last 29 years.

Senator PROXMIRE. I am talking about the Office of the Secretary of the Navy. In your statement you made some remarks about how the Office of the Defense Department has 30, 40, 50 people you were supposed to have in the initial legislation, now it is far bigger than that, many, many times bigger. That comparison is what I want.

Secretary LEHMAN. At the end of World War II, the Navy Department, the Secretary of the Navy's headquarters staff was in the range of 4,000 people. Now, we are down around 800 people all told, but the functions are considerably different.

Senator PROXMIRE. At the same time the Navy, like every other branch of the service is not as big as it was in World War II; is that right.

Secretary LEHMAN. It is not as big, but it is a great deal more complex. The shift has been away from sailors swabbing decks to computer specialists, and, let us face it, bureaucrats.

GENERAL DYNAMICS CONTRACT SUSPENSION

Senator PROXMIRE. On December 3, General Dynamics was suspended from winning Government contracts after the company and current and former four executives were indicted on fraud charges. That was the second time in a year that the company has been suspended.

What happened with the second suspension? Two months later the Navy lifted it, but only when General Dynamics agreed to be slapped on the wrist at the time and the Navy agreed it should not be suspended for past irregularities.

In other words, the Navy is going to let bygones be bygones. The Navy and the Pentagon keep making this big pitch that they are cracking down on contractor fraud. But isn't the way the Navy is handling the General Dynamics case sending a clear signal to the other contractors that they can get away with fraud if they are just patient?

Secretary LEHMAN. No, that is not an accurate characterization of Navy policy. We reached what I think is a dramatic new departure in handling the suspension cases.

First, as you well know, the purpose of suspension is not punishment. That is clearly prohibited in the application of suspension in the Department. Punishment is for the Courts and the judicial system to determine, not by the management through debarment and suspension.

What we are charged to do is protect the taxpayer. What was done in that agreement was to get to the root of the causes of all of the indictments, including another 11 or so investigations that could conceivably lead to indictments. It was designed so that changes were made in the management practices in each of the divisions that led to those allegations of abuses of mischarging of time, from IRD to cost contracts, and so forth, and to satisfy us that those practices are no longer in place and that management changes have been made and safeguard procedures put in place.

We have satisfied ourselves as to that. We have reached an agreement with General Dynamics that anything that comes out of those identified abuses which include some investigations still going on and allegations that have not been proven and, as you know, many of these allegations have proven to be foundless, will not lead to suspension. I am sure you were gratified, as I was to see George Sawyer totally exonerated by a jury of his peers, although some had accused him of being guilty before he was even tried.

ESTABLISHMENT OF ESCROW FUND BY GENERAL DYNAMICS

But the fact is, that anything that comes out of those known abuses will not lead to a suspension. General Dynamics has set up an escrow fund of $50 million, which is an unprecedented move, for immediate payment of anything that comes out of unknown abuses leading from those current investigations. But, if there are subsequent abuses that turn up, that have not been the subject of these investigations, they are not exempt from suspension or debarment coming out of those as yet undiscoverd problems.

So, that is the real picture.

Senator PROXMIRE. You say suspension is not designed as a punishment. I can understand that. Then it seems to me that the Navy should pursue far more vigorously than they have in the past urging the Justice Department to prosecute more vigorously than they have. I have the impression—as you may know, we have gone into the General Dynamic situation for a long time, many, many times over and over.

Here is a company that is encased in all kinds of difficulties, including four executives indicted on fraud charges. You say one has been found not guilty. Again and again we have this situation and no punishment at all.

You say the suspension is not a punishment. I think many people viewed as a kind of punishment. I understand that. You say the law provides it should not be a punishment. Perhaps not. There must be some way of providing effective discipline.

Secretary LEHMAN. Senator, I sympathize with your views. The way to do it is not to allow a company to get a monopoly hold on critical national security areas. That is not something that can be changed overnight. We are trying, as vigorously as we possibly can, to bring competition and multisourcing in to get away from the hold some companies have had as monopolies.

Senator PROXMIRE. I agree with you. It is a very frustrating job for you. It is so hard particularly with shipbuilding, so hard to find the number of sources to develop that. To me it will be as hard in the future as it has been in the past.

LIMITED NUMBER OF DEFENSE CONTRACTORS

You have done something with respect to Newport News, and so forth, but the number of contractors who can produce aircraft carriers, who can produce submarines, is so limited. You have at least an oligopoly.

The eighth Trident submarine is scheduled to go out for sea trials in May or early June. In order to stay within the SALT II limits of 1,200 MIRV'ed missiles, you will have to dismantle two Poseidon submarines. The two submarines that are reported to be dismantled are the *Linat Hale* and the *Andrew Jackson.*

Has any decision been made to dismantle the two submarines to stay within SALT II?

Admiral WATKINS. We have prepared all of the alternatives and a decision will have to be made in the April time frame. There are a number of alternatives, depending on just where we go with response to Soviet violations, and the outcome depends on the arms control talks in Geneva as well as related matters.

So, we are not yet at the decision point. In the budget submitted in 1986 there were ample dollars to move in any direction we need to move: Total dismantlement or continuing on with an overhaul of some type, or modification of the submarine, not unlike that which we did last fall with the new training submarines. As you know, one of those submarines dismantled is now being converted to a training submarine to go into South Carolina.

RECOMMENDED ALTERNATIVES

Senator PROXMIRE. You developed the alternatives. Did you make recommendations to the President or does the Navy Department make recommendation to the President as to preferred alternatives?

Admiral WATKINS. Those alternatives were prepared from a military point of view within the Joint Chiefs of Staff. That paper was sent to the Secretary of Defense. In turn that paper is part of the entire consideration that we place before the President, where the decision will be made.

Senator PROXMIRE. Was the recommendation that a Poseidon be dismantled?

Admiral WATKINS. It would be inappropriate for me to answer that question.

SAVINGS FROM DISMANTLED POSEIDONS

Senator PROXMIRE. Keeping in mind we are going to be looking for ways to save money this year, isn't it a fact it is less expensive to dismantle the two Poseidons and overhaul them to keep them operational?

How much money will be saved by dismantling the Poseidons than if we keep them operational?

Admiral WATKINS. I will have to provide the differential dollars for the record.

SSBN OVERHAUL COSTS

SSBN overhaul costs vary with each ship depending on the scope of the work. Since these ships require refueling overhauls, they would cost from $150–170 million per ship. The dismantlement and deactivation of each Poseidon submarine would cost approximately $20M. The differential savings from dismantleing vice overhauling each ship would be $130–170 million.

DISMANTLING OF SOVIET SUBMARINES

Senator PROXMIRE. According to the Department of Defense, Soviet military power, the Soviet Union has as of last year dismantled 12 subs since 1978.

Do you have a different figure today or is that still the figure?

Admiral WATKINS. The Soviet Union to date has complied with all aspects of Soviet ballistic missile submarines dismantlement.

Senator PROXMIRE. Is 12 the accurate figure that they have dismantled?

Admiral WATKINS. I will have to supply that for the record.

SOVIET BALLISTIC MISSILE SUBMARINE DISMANTLEMENT

The Soviet Union has dismantled 14 YANKEE-class ballistic missile submarines since 1978.

VIOLATIONS OF SALT AGREEMENTS

Senator PROXMIRE. If we start dismantling the Poseidons, cannot we stop the Soviets from dismantling their subs?

We will not gain anything net compared to the Soviet submarine power. Is that correct?

Admiral WATKINS. I think that question deserves a much broader answer than yes or no. I am not sure what the Soviet response would be. On the other hand, Congress has been informed by the President of a number of significant violations in compliance with SALT agreements. Therefore, the question is raised as to whether or not there is going to be some sort of response to Soviet violations of prior treaties.

I do not know the answer to that. That is a very complex issue. These are older submarines. The validity of that part of the strategic deterrence today is quite a bit different than it was even 10 years ago; accuracy, payload, that sort of thing comes into play. Could those submarines be used for alternative purposes? The answer is, quite possibly. I am not so sure that a decision will not be made to perhaps modify them for other purposes. We need survivable launch tubes at sea. No matter what you look at for the future, that kind of capability is needed by the Nation.

Senator PROXMIRE. He could modify them and in doing so, he could comply with SALT II; is that correct?

Admiral WATKINS. I believe this country, this Nation, does not need to have Soviet national technical means looking over our shoulder. We give them the information in these hearings. We give it to them in the press. We invite them to come aboard and take pictures sometimes, or the equivalent of it. We are not going to be able to get away with anything that would smack of violation, if, in fact, that is the decision of the President.

We are not going to do anything to undercut prior SALT agreements. My feeling is, were we to convert, we would be able to invite people to come aboard and the most intrusive type of inspection would be allowed. The Soviets have not wanted to engage in those intrusive inspections.

Senator PROXMIRE. You are not going to undercut?

Admiral WATKINS. When you talk about undercut, the answer relates to the normal means agreed to in those treaties by national technical means of monitoring. Therefore, in our country why not walk aboard and see what you have for yourself. I would think over time we will be looking at possibly modifications that could be "open and inspect, come aboard." More intrusive inspection means could be developed. We should no longer need to count these arbitrarily in some sort of formula that might have been valid 10 years ago, but may not be valid today in view of the proven Soviet violations in other areas. I do not look at it as submarines cut up versus submarines not cut up and yet ignore the other areas of violation like the Krasnoyarsk radar, for example.

Senator PROXMIRE. Thank you very much, Admiral, and thank you, Mr. Secretary.

COAST GUARD

Senator STEVENS. Mr. Secretary, last year in the whole problem of the budget we had a considerable battle over the Coast Guard, as you know. I have been one who has viewed the Coast Guard as a defense agency. We made available and Congress insisted on making available $375 million to the Coast Guard for acquisition of new equipment that was put into a special fund for the Navy in order to make certain that it was totally authorized.

I remember the long battle we had between authorizers and appropriators on both sides. This was the key issue, as a matter of fact, and we finally got agreement that those monies were expressly authorized by the Appropriations Committee.

So, there is no question about authorization and now we get word somehow or other that the Navy has decided to recommend those funds not be made available to the Coast Guard.

I would like to know if that is true and what is our problem?

Secretary LEHMAN. That is not true, Senator. We are prepared to transfer the money as soon as the Defense Comptroller authorizes us to release it.

What may be the cause of the misinterpretation is that we are hopeful that the larger issue of the appropriated and not authorized problem which entails a much larger number of programs for us, including the Mariner program, is not piecemealed and broken apart, but solved as a single issue here, because we support all of those programs and we are anxious to get on with them. But the minute we are authorized to transfer the money to the Coast Guard we are prepared to do so.

Nevertheless, once the money is transferred to the Coast Guard account, they are still under the same problem that we are under right now.

Senator STEVENS. I will pursue it further with OMB. I am reading between the lines that someone has to move on that. The agreement further—was that in the future those funds for the Coast Guard of a military nature must be authorized now by the authorizing Committee. So, in the future the battle comes through the authorization.

SECURITY IN ARCTIC AREA AND GULF OF ALASKA

Let me say, Admiral, I was delighted to have your comment about the problem of maintaining security of the Arctic area and the Gulf of Alaska in terms of where the Navy is homeported. I was doing some research the other day and discovered since I have been in the Senate the Russians have established a firm position in the North Pacific and they now have more vessels in the North Pacific than you seek to have for the Navy worldwide.

I do not know how many people realize that constant aggression to the North Pacific Navy by the Soviet force, but it is something that I would like to see highlighted sometime and not getting provincial for the purpose of getting defense assets back to Alaska, but perhaps one of these days we will see about having some ability to at least refurbish our repair facilities so that you do not have to go all the way back to the San Diego area.

It seems to me to be a difficult problem in terms of Navy operations. We welcomed, as you know, overwhelming the task forces that have had their training in the Gulf of Alaska and in the North Pacific area.

I do think something has to be done in terms of programming to have at least a wartime capability of taking care of vessels, surface vessels, in our region. I know of none that exist now.

Admiral WATKINS. Mr. Chairman, you have raised a very key strategic issue. It is one where over the past 3 years the Chiefs of Staff have uniformly pressed hard to bring together the disparate programs and not get ourselves in a position such as that prior to World War II in that area of the world.

OVER-THE-HORIZON RADAR

It is an area critical to U.S. security. We are talking about defense of the United States. There are only a few miles between the Soviet Islands and U.S. Islands in the very northern part of the Bering Straits. Further south we are only a few hundred miles south of Petropavlovsk in the Western Aleutian Islands. The U.S. Navy, Air Force and the Army are all putting resources in improved land based defenses in the region. We are putting in an Over-The-Horizon radar system for the Air Force. The Navy is also putting in a Relocatable Over-The-Horizon radar in Adak. We are beefing up the piers there. We are very concerned about the kind of vulnerability existing in today's unstable world.

It is extremely important strategically to send the signal that we are not going to give any of that territory away, even in the far reaches of the Aleutians. We are there to stay. Our battle groups are up there integrated with the Air Force and integrated with the Army units.

FORCE BALANCE IN THE ALASKA AREA

We have discussed with you on a couple of occasions the urgent need to formulate in Unified Commands a concept that would allow us to address Alaska as a unit because it is so critical. We need to bring these various programs into balance so that we can focus on the critical regions of the world. This region is one of the Unified Command areas which is so important to us.

LOCATION OF PACIFIC HEADQUARTERS

Senator STEVENS. I know that. The difficulty with that is that every time I see a plan it involves having the headquarters for the whole Pacific region in Hawaii. That means all of our communications have to go through Hawaii to come to Washington which to me is a very unfortunate plan.

I think it ignores the relationship of Alaska to Japan and Alaska to the North Pacific and even currently, the planned operations in the Japanese are through Hawaii. That is like planning operations for the North Atlantic by going through Puerto Rico in terms of distance, in terms of the whole concept of being able to respond.

We lived through that one before. Alaskans are very wary of that. I look forward to discussing it. This is no place to go into that kind of provincial thing. I have been trying to avoid that. I do think that the whole concept of the national interest in terms of the Soviet presence in the North Pacific is being sort of ignored.

We have our fishing fleets that come up from California, Oregon and Washington. They are constantly under surveillance by naval vessels from the Soviet Union. When the Navrin Basin was being explored there along the line that separates the United States from the Soviet Union in terms of a great potential for oil and gas, the people who were operating helicopters out there told me they were constantly harassed by Soviet naval aircraft.

At one time they came between the helicopters and the launching pad with naval aircraft trying to really scare them off from utilizing the facilities that were there for exploration. That is a disputed area between the United States and the Soviet Union, as you know.

We have no surface craft up there for the Navy except when you bring them up as a task force. The reason is the distance. Again, the distance is so great. Most people do not realize how far it is from those areas of the Aleutians to Seattle or San Diego.

I think something has to be done to assure that we will have a surface naval presence in that area. It is in long-term plans, but I hope we will get to it.

REQUEST FOR V-22

I am interested, Mr. Secretary, in the V-22 which we used to call the JVX. I understand that you have reduced the JVX total program cost by $9.5 billion. The cost has come down through fixed price contracts. I congratulate you on that.

What about the IOC for that program with that reduction? Is that still going to be maintained?

Secretary LEHMAN. We have not backed off at all on the IOC. I think that what we have achieved with our new acquisition policy with the V-22 ought to be a case study of the right way to bring a really new innovative program to fruition.

All of the new policies that we have applied to Navy acquisition are found in the V-22. We have reached an agreement on a very tight package of fixed price development with very clear milestones and we have not to exceed prices for the production phase.

Senator STEVENS. You did not multi-year it, though?

Secretary LEHMAN. No, we did not because we believed we could achieve a much better price reduction to the Navy through competition and we have built in competition from the very start. Starting with the first year of production after pilot production, there will be a split buy between Bell and Boeing and they will compete every year thereafter for a split buy. We will have two production lines and real competition every year for the life of the program. I believe the program is going to blossom into a great many tilt rotor variants using that technology for commercial and other military applications.

GUIDELINES ON FIXED-PRICE CONTRACTS

Senator STEVENS. You did protect several of your fixed price contracts and your multiyear contracts from sequestering under Gramm-Rudman. Others like this V-22 you did not.

What were the guidelines that you used.

Secretary LEHMAN. At the time we protected those fixed price programs, we had not yet reached agreement on the contract. We had very protracted, difficult negotiations which concluded after the Gramm-Rudman 1986 budget action was taken. We had hoped to protect it but it ended up not being protected.

We will be discussing with you ways to ensure that we don't affect the program. There is still some flexiblity in 1986 within the Budget Program Element [BPE] and this is certainly a program we must protect.

MULTI-YEAR CONTRACTING ON F-18

Senator STEVENS. You mention flexibility, but we also noted on the F-18 now you want multi-year procurement approval and increase production.

How do you get consistency out of that?

Secretary LEHMAN. The difference is in time and the fact that we will have two sources of production from the beginning with the V-22. We are sole source with the F-18. Multi-yearing makes a lot of sense in sole source situations. Competition, I believe, tends to yield more annual savings than multi-year procurement does. But for the F-18, right now we only have one source.

What we want to do is take advantage of the tremendous progress we have made in productivity in bringing down the price of the F-18. We want to make hay while the sun shines and buy the program out early, to get still lower unit prices and be better able to complete the program at a lower total price.

SHORTAGE OF A-6 AIRCRAFT

Senator STEVENS. CBO told us you overstated your requirement. You have more F-18's than you need and shortage of A-6's.

Secretary LEHMAN. Yes, that is probably true. We are certainly short of A-6's. The total number of F-18's required could vary by the last year of the buy because we are experiencing considerably lower attrition than forecast. It is a much safer airplane than any airplane we have had before.

Senator STEVENS. Looking through the tunnel I see for defense appropriations between now and 1990, why is it wise to ramp up the production rates of something like the F-18?

Secretary LEHMAN. Because this fighter has come down in price dramatically, unlike any other fighter plane in the Air Force or Navy. We have brought top management attention from within McDonnell-Douglas and Northrop and very real innovation on the production line to bring this price down.

Now that we have it down there with a really effective production line, we want to take advantage of it and buy the program out and get on with the V-22.

REENLISTMENT BONUSES FOR MARINE CORPS

Senator STEVENS. General, every once in a while I look at some of these things too closely, but tell me about one thing. We have record high retention now in the Marines and yet this year we have a request to increase the up front payment for reenlistment bonuses from 50 percent to 75 percent costing an additional $107 million.

If the retention level is so high, why do we need to increase reenlistment bonuses at this time?

General KELLEY. The simple fact, keeping our quality people basically goes back to the first question asked about pay raises, too. There are a lot of elements involved in retention.

As an example, Senator, when we take a young Sergeant and move him from Camp Lejeune or Cherry Point up to New York City, the cost of living is just tremendous. To give you one example, the insurance on his car goes from $450 to over $2,000. All of these costs are not in any way programmed into any kind of operations. These are the kind of bonuses that you must use to compete with the civilian life to keep young, good people on active duty.

Senator STEVENS. I understand that. I have the same problem trying to move young people down from Alaska to here. The people think the cost of living is high in Alaska, and it is, but if you move down here, you might as well be moving cost down here; it is just off the wall. That is a good justification.

Senator Sasser.

Senator SASSER. Thank you, Mr. Chairman.

RESTRUCTURING OF DOD AND JOINT CHIEFS OF STAFF

Mr. Secretary, the Senate Armed Services Committee is reviewing proposals to substantially change the way DoD and the Joint Chiefs of Staff are structured.

What are your views on the legislation which passed the House last year which would increase the authority of the Chairman of the Joint Chiefs and make the Chairman and not the Joint Chiefs collectively the principal military adviser to the Secretary of Defense and the President?

Secretary LEHMAN. I have a very schizophrenic view on this reorganization proposal. As you know, I have been calling for years for a major change in the reduction of the bureaucracy, strengthening the centralized policy making, decentralizing execution and reducing the size of bureaucracy across the board.

However, I see a great deal of trend in the other direction in some of the proposals that have been in the House and the Senate proposals that call for more centralization and less decentralization.

With regard to the Chiefs, what is essential is that we maintain the corporate nature and the multiplicity of views in recommending options and advising the civilians in the NSC, the Congress and the President.

There are certainly ways that improvements can be made. I would like to ask my two colleagues to address that as well. More order to the staffing of the Joint Staff could certainly add effectiveness to it and the Chairman could well gain by that.

However, if reorganization were to interpose an obstruction, in the form of a deputy, for instance, that would become an obstacle between all of the Service Chiefs and the Secretary of Defense, preventing them from speaking directly to him, on a daily basis and having access to the National Security Council. That would be a very bad move in the wrong direction.

I think that the bill that was passed by the House last year needs to be changed. It does some very good things, but, it also does what I think are some very damaging things to the civilian access to differing advice.

The last thing we want in this country is to have one military voice, one monolithic source of options to the civilian decision-makers here in Congress and in the Executive Branch.

INTER-SERVICE RIVALRY

Senator SASSER. What should we say then to the criticism that inter-Service rivalry would prevent objective military advice from being presented to the civilian planners?

Secretary LEHMAN. I really think that is baloney. I would like to ask the two members of the Chiefs here to comment. I have been in this business for 18 years now. Yes, I have seen inter-Service rivalry, but on the scale of things that interfere with efficient operation of the military, it is way down in the background noise.

When I go out to the fleet and I see the exercises going on between the Air Force, and the Navy and the Army. I see the joint sharing of bases, and all that is done by good common sense people integrating their activities.

No exercise goes on at sea today without Air Force AWACS and F–15's fully integrated into it. No exercise goes on in Central Europe without the participation of the Navy. Inter-service rivalry exists primarily in think tanks in Washington and in staff studies done by people that are detached by too many years of staff work from the actual feel of what is going on out there.

Other than that, I think it is a great idea. [Laughter.]

Admiral WATKINS. Senator Sasser, I think you will find that the Commandant and I are very much in synchronism with that. We have testified five times before the Congress in the past 3 years on this issue. I believe what you are seeing here has been an attack by critics of the last decade trying to solve last decade's problems and trying to impose their will on this decade's leadership. We do not need the kind of radical surgery that will kill the patient that is well on the way to recovery.

Perhaps we have not blown our horn enough over here, but we have made major changes, mostly along the lines that are included in the House bill. In fact, we have agreed with about seven aspects of the House bill, four with minor modifications. The only stumbling block is this issue about the corporate body of Chiefs that the Secretary mentioned. Unless we retain the strength as a corporate body, and unless we act as Chairman in the Chairman's absence when movements of forces are involved, the National Command Authority will not get independent military advice, unfiltered and unfettered.

I believe you would lose civilian control of the military unless you assure that the chief executives receive all divergent views. We do not want to have a one-to-zero vote every time. On the other hand we would expect the Chiefs would not to be in favor, every time, of the administration's position.

You will recall when the closely spaced basing issue came up following the multi-protective shelter [MPS] debate, and so forth, that the President was asked to make a decision in March by the Congress, I think it was 1983. It was the Chiefs who debated that intensely, the Joint Chiefs of Staff. Unfortunately, confidential discussions and results leaked to the press that the vote was three to two against the MPS concept. My guess is that if it had been a Chairman with the sole military advice to the President, you would have had one to zero vote for MPS.

What does that mean? We never vote in this town on anything significant and get 435 to zero in the House and 100 to zero in the Senate. Not on issues that are very controversial. We should not expect the Joint Chiefs of Staff to come up with a five to zero vote every time, and we do not. We think we have a harmonious group that has worked well together. We have made major exchanges ourselves. We have opened our books to complete review.

We also believe too many bureaucrats are down there. We know changes have to be made and we applaud many of the changes that have come out. But the so-called Senate staff report being discussed by the Armed Services Committee I think is irresponsible. And I think it needs to be exposed as being irresponsible. Even the Senate has disregarded the majority of the recommendations in it and which are heavy handed, using such terms as log rolling, inter-Service rivalry and the like, which do not exist in this administration. We have been over to visit the President 13 times on critical issues, more time with this group of Chiefs and this President than in the prior 12 years with all other Presidents.

He uses us. So the user of that information has to want it and has to seek it. This President and this Secretary of Defense do. When we go over to see this President, the Secretary of Defense will say, "Mr. President, you should hear the positions of the Joint Chiefs. They differ from mine." That is a big man. The President wants that and yearns for that information. He does not want to hear a one to zero vote every time which could be politicized. This Nation should never permit it.

I would urge this committee to insert itself in the process and not allow the steam rolling of changes that can do irreparable damage for the long term. I will not be here to reap the harvest for that, but you will be here.

CORRESPONDENCE AND PREPARED STATEMENT

I hope you will allow me to enter into the record my letter to Chairman Goldwater because it is germane to your question. I think this committee should have access to that information because it will be a useful resource ramifications for any decision made in that regard.

Senator STEVENS. Senator, I thank you for raising that issue. We will be happy to receive that and make a copy available to every member of our subcommittee.

CHIEF OF NAVAL OPERATIONS

4 February 1986

Dear Mr. Chairman,

I appreciate the opportunity you and Senator Nunn provided to the Joint Chiefs last evening to discuss, in roundtable fashion, the draft bill on defense reorganization. I found our discussions candid and useful, and hope you did as well. Even so, I thought a letter outlining my position in a more cohesive form might prove of value as your Committee markup proceeds and debate continues on this critical subject. I have provided an identical letter to Senator Nunn.

As I indicated during our discussions, I believe our nation would surely be standing into shoal water, with severe damage predictable, if we were to follow the course charted for us in the current draft bill now before your Committee. In short, I consider the bill as drafted to be terribly flawed and certainly not in the best interests of national security.

The proposal goes far beyond many of the recommendations made by witnesses heard by your Committee. It ignores effective work done over the last few years and attempts, instead, to address leadership and other problems of the 1970s. In this connection, and insofar as operations of the Joint Chiefs of Staff are concerned, the large majority of last decade's problems have been repaired and simply do not exist today. The draft bill specifically ignores views and recommendations of those most closely involved with the current organization -- those responsible by law for sharing national security burdens with you.

The power this draft bill would bestow on the Chairman would militate against providing the best military options and advice to civilian leadership. Potential is great for politicizing his position. The legislation inhibits timely and necessary provision of differing perspectives and views by experienced military experts. Advice from a single military individual will not ensure that the full range of effective military options, essential for true civilian control, are provided to the Commander-in-Chief.

In radically restructuring the JCS, Military Departments and operating forces, the draft bill would eliminate the now-close and time-tested relationship between the Congress and the Service Secretaries and Chiefs. Additionally, the proposal would emasculate the role of experienced Service Chiefs in the defense planning process.

The proposal would dilute the CINC's primary focus on warfighting. Becoming more deeply involved in the administration, training, and support of his Service components, each CINC would be distracted from his primary tasks of building effective deterrence plans in concert with national policy and doing the war planning which should be his undiluted responsibility. Our combat commanders would become bureaucrats instead of warfighters. Responsibility and accountability -- now clearly defined for support, administration, training, and readiness -- would be shared, diffused and sometimes lost.

The current JCS and Service Chiefs global perspective and concern for future capability which counterbalance the CINC's natural emphasis on regional requirements and today's force posture, would be lost. Our national security planning over the long term would fast become warped.

A detailed analysis of problems with the draft bill would be as lengthy as the bill itself. But, to be constructive, and in the interest of brevity, I have reviewed the response submitted to you by the Secretary of Defense on February 3, 1986, and endorse all points provided in his letter as they relate to the Joint Chiefs of Staff and the combatant commands.

You are correct, Mr. Chairman, when you say we need change. I, too, am for change. As you are aware, the Secretary of the Navy and I have made significant organizational changes within the Navy.

Likewise, I have been a vocal proponent of change within the Office of the Joint Chiefs of Staff. In fact, rather extensive changes in previous ways of doing business have been made within the JCS over the past three to four years. All Chiefs take considerable pride in this aggressive, internal reform. We agree that even more changes are needed, and I have testified as to specifics in this regard. But, the draft bill before you is not change the country needs.

Because of the foregoing, I am most concerned about passage of the draft bill in language even approximating its current form. For, unless its underlying philosophy -- that which effectively destroys the corporate body strength of the Joint Chiefs of Staff and concommitantly dilutes independent military advice to the National Command Authority -- is significantly altered, the Senate's bill would represent a dangerous starting point for compromise with its counterpart bill already passed by the House of Representatives. It is difficult to conceive of a compromise, somewhere in between these two, that would not gravely weaken the nation's organization for national security.

Because we share the same fundamental objective for efficient management of a strong national defense, I know that you and your members will improve on the draft bill as you consider it in the days ahead. Nonetheless, because the consequences of this effort can be so far-reaching, I felt it important to reiterate to you in writing what I attempted to convey last evening in words. I urge major revision to the draft bill.

Sincerely,

JAMES D. WATKINS
Admiral, U. S. Navy

The Honorable Barry Goldwater
Chairman, Committee on Armed Services
United States Senate
Washington, D.C. 20510

COMMENDABLE SERVICE OF ADMIRAL WATKINS CORPS

Senator STEVENS. I want you to know that the three of you have represented the joint leadership of the Navy and the Marine Corps in exemplary fashion. We, unfortunately, come to another time when there is going to be a retirement or at least a stepping down.

Admiral Watkins, I do not know what your plans are, but during your watch the Navy has fared very well. We all know you are a very patient man with sterling qualities of leadership to be able to survive with the Secretary whom we love very much and would not speak of him in this way if it were not for the fact we have great feelings for both of you.

I really think the country has been well served by the three of you. I have been privileged to be able to be here during your appearances.

Admiral, God willing, I will be here for a long time and you had better believe we will be involved in anything that will in the long run increase the cost of the operation. I think some people do not realize that in diversity we do have again the factor of competition within these Services that lead us to eventually some decisions that we allocate resources to this Service or that because we think they can do it a little better.

It is based on the circumstance of leadership at times. Sometimes it is a little better in one part of the Department than another. That is good, in my opinion. So, we are going to be involved. We welcome that comment of yours. I appreciate your help.

SUBMITTED QUESTIONS

The committee has additional questions which we will ask you to answer for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR ANDREWS

FY 1986 COAST GUARD PROCUREMENT FUNDS

QUESTION: The Coast Guard budget request for FY 1987 is only $77 million for the Capital account (Acquisition, Construction and Improvements - AC&I). According to the Department of Transportation, this level is predicated on Navy's deferring $190 million of the Coastal Defense Augmentation fund appropriations until FY 1987. What is the status of, and the rationale for, this deferral proposal? Provide a list of what capital items will be procured this fiscal year and which are being deferred?

ANSWER: The Coastal Defense Augmentation, Navy (CDA,N) appropriation was approved by Congress in FY 1986. Since a portion of this appropriation was financed with prior year unobligated balances, the Department intends to fully comply with all provisions regarding such, specifically section 8103 of the FY 1986 Appropriation Act, and will make all CDA,N funds available for procurement of USCG requirements in FY 1986. Questions concerning the Coast Guard's FY 1987 budget should be addressed to OMB or the Coast Guard.

QUESTIONS SUBMITTED BY SENATOR JOHNSTON

JOINT FIGHTER DEVELOPMENT

QUESTION: Both the Navy and the Air Force have plans underway to develop a new fighter aircraft in the 1990s. Estimates for the costs of these new fighters run well over $40 billion. Has the Navy considered the production of a joint fighter, as we did with the F-5 series, in order to save as much money as possible when we have so many new and expensive programs ready to come off the drawing boards that will compete for very scarce funds? I would appreciate a detailed response to this question be submitted for the record that covers any proposed plans along this line and the mechanism being used to evaluate this proposal.

ANSWER: The Navy and the Air Force have had a Memorandum of Understanding (MOU) concerning interdependent ATF/ATA technology since 22 April 1985, to address the use of the ATF/ATA by the other services when the definition of the aircraft matured.

Above and beyond that level of cooperation, however, the current and future budget realities and the large RDT&E investment projected for the development of these two aircraft make it certain that both will be the subject of intense scrutiny and debate. It is therefore imperative that both the Navy and the Air Force thoroughly examine potential cross service applications of the two aircraft to fill possible future requirements and as a means of amortizing development expenses over a larger number of aircraft rather than developing totally new aircraft. Accordingly, on 4 March 1986, the Secretary of the Navy and the Secretary of the Air Force signed a MOU for the cross-service utilization of the USAF Advanced Tactical Fighter and the Navy Advanced Tactical Aircraft.

This MOU will establish a mechanism for the Air Force to examine the ATA as a candidate to fill future close air support/interdiction mission needs and the Navy to examine the ATF as a candidate to fill future air superiority mission needs. A need exists to identify, at the earliest possible point in the development process, design and system changes that would need to be made on each aircraft to minimize the engineering, testing and funding to develop variants in order to make them suitable for the other Service's mission requirements.

QUESTION: Regarding your plans for the next generation fighter, do you have any plans to insure competition throughout both the RDT&E and the procurement processes?

ANSWER: The Navy is undertaking the Advanced Tactical Aircraft Program employing the full acquisition strategies that have been implemented by the Navy. Competition has been built in from program initiation and will continue with two manufacturers competing head-to-head each year in production. The Navy is capitalizing on developed and proven U.S. technologies from other programs, and is aggressively seeking commonality of technologies and subsystems between the ATA and USAF ATF. The Advanced Tectical Fighter (ATF) will be developed by the USAF employing their development and procurement policies which will contain competition throughout the program.

MSH MINESWEEPER PROGRAM

QUESTION: I recently participated in the keel laying ceremony for the first of the CARDINAL CLASS minesweeper at the Bell Aerospace Facility in New Orleans. I was very impressed with the facility and the overall professionalism of the people involved. Would you comment on how you envision the progress of this program and how many of the MSH design ships the Navy plans to procure?

ANSWER: The detailed design has progressed slowly over the past 15 months. There are a number of technical risk areas. The Navy is working closely with the contractor during this design process, monitoring his progress and solutions. The increased contractor engineering effort needed to resolve these risks is taking longer and costing more than the contractor had planned, but it is necessary to ensure a valid design. The contractor has already voluntarily delayed the start of lead ship production pending additional shock tests to test section. Subsequent to these data-gathering tests, the contractor will present a plan for additional design and testing that will be required to validate the MSH and thereafter proceed with production.

The Navy intends to continue with the original acquisition strategy, that is, to procure 17 ships, but not until all design problems are resolved.

LCAC

QUESTION: It is my understanding that the Landing Craft, Air Cushion vessel recently passed a significant milestone in the testing program conducted by the Navy. Would you give me your thoughts on the results of this test and the outlook for the program for the future?

ANSWER: During the week of 10 February 1986, LCAC 002 underwent successful acceptance trials (AT) at the Naval Coastal Systems Center, Panama City, FL. The craft was subsequently delivered to the Navy on 22 February 1986.

The LCAC program is scheduled for a number of significant events during the next six months. LCAC 001 is scheduled to undergo Final Contract Trials simultaneously with LCAC 003 Acceptance Trials in late April 1986. LCAC 003 will be delivered to the Navy shortly thereafter. Extensive Developmental Testing of two LCAC in conjunction with USS WHIDBEY ISLAND (LSD 41) will be conducted in May 1986 with further Operational Testing in June/July 1986. Successful completion of Operational Testing will be followed by a Navy Program Decision Meeting in July 1986 and Approval for Full Production. We anticipate contract award for the remaining FY---85 and all FY-86 craft in September 1986.

V-22 OSPREY

QUESTION: As you know, I have been a strong supporter of the JVX or as it is now being called the OSPREY tilt rotor aircraft. Not only do I believe this new technology has tremendous promise for the Navy and the other services, I am also convinced that it will have significant commercial success as well. Can you comment on the progress to date and where you intend to go with this program?

ANSWER: The V-22 is successfully completing a two and a half year preliminary design phase. We are very pleased with the results so far and plan to transition the program into full scale development in April of this year. During the past year the Navy has been examining other mission areas for which the V-22 could be used. The most promising area is the ASW mission. We plan to replace the S-3 Viking with the V-22 as the Viking is phased out at the end of its service life.

Along with the Navy's study for other mission variants of the V-22 the FAA, NASA and DOD have been conducting a study for the civilian applications for the V-22. This study includes the potential for other versions and sizes both civil and military, civil certification issues, and the impact of defense industrial technology spin-offs on civil production.

QUESTIONS SUBMITTED BY SENATOR BYRD

Military Construction in West Virginia

QUESTION: Mr. Secretary, on June 20, 1985 during Senate consideration of the Fiscal Year 85 Supplemental Appropriations Bill, I engaged in a colloquy with the Chairman of the Defense Appropriations Subcommittee, Mr. Stevens; the ranking Minority Member of the Senate Armed Services Committee, Mr. Nunn; and the Ranking Minority Member of the Military Construction Appropriations Subcommittee, Mr. Sasser; in which I secured their support for accelerated design and budgeting for military construction projects in West Virginia.

In addition, Senate Report 99-168, dated October 31, 1985, accompanying the Fiscal Year 1986 Military Construction Appropriation Bill included the following passage at my request:

DOD FACILITIES IN WEST VIRGINIA

The Committee understands the need to accelerate the military construction program contemplated for West Virginia which has been raised in hearings before the Senate Committees on Armed Services and Appropriations. The matter has been the subject of discussion on the Senate floor during the processing of the Fiscal Year 1985 Supplemental Appropriations Bill. This need to accelerate the program has been the subject of correspondence with high-level military officials as well as discussions with the Secretaries of the Army and Air Force. The thrust of these discussions has been that early construction of these various projects will help provide the much needed jobs; avoid the costs of inflation associated with delayed construction; and provide modern updated facilities for use by military personnel in West Virginia. The Committee supports these arguments and directs the Department of Defense to redouble its efforts to accelerate the design of the various projects and to incorporate them into the Fiscal Year 1987 President's Budget so that they may receive early consideration by the appropriate committees of Congress.

Mr. Secretary, please update for the record the information provided last year regarding which construction projects are contemplated in the latest Navy and Naval Reserve Five-Year Plans for West Virginia. Please indicate the project description, the location, the estimated cost and the fiscal year in which the project is contemplated. Which, if any, of these projects could be accelerated into Fiscal Year 1987?

ANSWER: No MCON or MCNR Projects are in the current Navy Five Year Plan for Navy facilities in West Virginia.

QUESTION: What more can be done to accelerate the construction of West Virginia Navy and Naval Reserve facilities in response to language included, at my request, in the report accompanying the Fiscal Year 1986 Military Construction Appropriation Bill and the urgings of my Colleagues?

ANSWER: No MCON or MCNR Projects are in the current Navy Five Year Plan for Navy facilities in West Virginia.

QUESTION: What is the situation regarding modernization or replacement of the facilities in Huntington, West Virginia?

ANSWER: No MCNR projects are planned for Huntington, West Virginia. An O&MN project for $570K is scheduled to be funded in late FY-86 to alter and repair the Naval Reserve Center at Huntington.

Allegany Ballistics

QUESTION: Mr. Secretary, would you please give me an updated schedule, including significant milestone events, leading to the full realization of the following:

The replacement of the solvent preparation building at the Allegany Ballistics Laboratory, a Navy-owned, contractor-operated facility at Rocket Center, West Virginia, for which I secured $2.5 million in the FY 1986 Defense Appropriation Bill.

ANSWER: On 1 October 1985, we awarded a contract to Hercules Incorporated (plant operator) to replace the building. Hercules estimates that by July 1986 the building design will be complete; bidding and sub-contract award will be made soon thereafter. Ground breaking should occur in late November 1986. Beneficial occupancy date is Nov 87.

QUESTION: Mr. Secretary, would you please give me an updated schedule, including significant milestone events, leading to the full realization of the following:

The conversion of an oil-fired boiler to a coal-fired boiler at Allegany Ballistics Laboratory, for which I secured $2.5 million in the FY 1986 Defense Appropriations Bill.

ANSWER: The cost estimate is now $3.8 million. NAVSEA is looking at the scope. We expect a decision by June. It will take six months to complete the design. Construction will then take 1 1/2 years.

QUESTION: Mr. Secretary, would you please give me an updated schedule, including significant milestone events, leading to the full realization of the following:

The replacement for the propellant casting building at Allegany Ballistics, for which I secured $3.5 million in the FY 1986 Defense Appropriation Bill.

ANSWER: Hercules is preparing the initial proposals for replacing the propellant casting building. We expect this proposal by 1 April 1986. The funding is available, and we will proceed with the award once their proposal has been received. The design phase will require six months and construction will take approximately 1 1/2 years.

FY 1986 COAST GUARD PROCUREMENT FUNDS

Mr. Secretary, I am the principal co-author, along with Senator Chiles, of the amendment which resulted in providing an additional $375 million to the Navy Budget in the FY 1986 Defense Appropriation Bill for Coast Guard equipment, including four C-130 aircraft. The four additional C-130 aircraft are of special concern to me inasmuch as parts of these aircraft are assembled in the Lockheed Clarksburg plant, in West Virginia. This initiative was sponsored by 36 members of the Senate, and strongly supported by the Chairman of the Defense Appropriations Subcommittee (Mr. Stevens). Sixteen members of the Appropriations Committee were cosponsors, including ten members of this subcommittee.

QUESTION: Mr. Secretary what are the Department's plans for implementing this strongly supported initiative of the Senate?

ANSWER: The Coastal Defense Augmentation, Navy (CDA,N) appropriation was approved by Congress in FY 1986. Since a portion of this appropriation was financed with prior year unobligated balances, the Department intends to fully comply with all provisions regarding such, specifically section 8103 of the FY 1986 Appropriation Act, and will make all CDA,N funds available for procurement of USCG requirements in FY 1986.

QUESTION: Mr. Secretary, I trust that you and your colleagues will keep me personally informed on all matters relating to the Navy and the Naval Reserve in West Virginia. May I have your assurances on that?

ANSWER: Senator, you have my assurance that the Navy will keep you personally informed on all matters relating to the Navy and the Naval Reserve in West Virginia.

QUESTIONS SUBMITTED BY SENATOR D'AMATO

STRATEGIC HOMEPORTING

QUESTION: What effect will Gramm-Rudman-Hollings automatic reduction in FY 87 have on the homeporting effort?

ANSWER: The Navy's budget has been constructed based on the assumption that the provisions of the act will not be triggered. No clearly defined impact can be determined without knowledge of the impact of spending bills, the size of the deficit, etc. Should the automatic reduction be triggered, Strategic Homeporting will be affected as well as every other Navy program.

QUESTION: Would you delay or defer scheduled homeporting of Battleship groups or carrier groups to save costs?

ANSWER: No. Strategic Homeporting is designed to enable the Navy to accommodate the 600 ship Navy, which is already appropriated and under construction, without severely overcrowding current homeports. More importantly, it will overcome some strategic shortcomings inherent in our current posture.

Buy Our Spares Smart (BOSS)

The General Accounting Office has given me an advanced copy of their report on replenishment of spare parts, prices, and management, which was done at my request. One of the locations studied was the Ships Parts Control Center (SPCC) at Mechnicsburg, PA. This report found serious deficiencies in operations there.

QUESTION: I understand, despite aggressive efforts to improve the situation, these problems exist. Please provide the Committee with a status report on the implementation of your "Buy Our Spares Smart" (BOSS) program at SPCC, with particular emphasis on your plans to install a new automated system to monitor and control spare parts procurement.

ANSWER: Since inception of the BOSS program in FY-84, significant cost avoidances have been achieved through competitive procurements as indicated below:

	FY-83	FY-84	FY-85
Navy Wide System Cost Avoidances	-	$193M	$328M
Percent Competitive Procurements at SPCC	21.1%	35.3%	39.3%
Value Competitive Procurements at SPCC	$294M	$432M	$500M

Monitoring and control of spare parts procurement is a significant portion of the ongoing resystemization program at SPCC. Included in this program is the capability for on line documentation preparation and award processing, improvements in acquisition audit trails and integration between financial and purchase files, and development of an automated interface to on line technical drawings. Resystemization is being incrementally implemented at SPCC and will be completed by March 1989.

The lack of identification of competitive automated procurements at SPCC as cited in the draft GAO report has been corrected.

QUESTIONS SUBMITTED BY SENATOR PROXMIRE

NAVY RECRUITING PROBLEMS

Admiral Watkins, in your statement you indicate that fiscal year 1985 was a tough recruiting year, and quality declined from fiscal year 1984.

You also indicate that the size of the Delayed Entry Pool — the group of recruits who have agreed to enter service at a later date -- is a primary bellweather indicator of future recruiting trends.

In 1985, the Navy was forced to draw down the Delayed Entry Pool (DEP) because total new enlistments were less than accession needs. You characterize this drawdown as a significant indicator of a more difficult recruiting environment and potential problems with the quality of future accessions.

Question: What plans do you have to deal with this problem?

Answer: The FY 1987 President's Budget requests an increase of 518 recruiters and 172 enlisted support personnel above the recruiting manpower levels authorized for FY 1986. This increment is needed to accommodate the higher accession goal programmed for FY 1987 and to compensate, in part, for the declining recruiting environment. However, the Navy's Delayed Entry Pool (DEP) will still decline by about 4,000 at the end of FY 1987. In order to further halt this DEP drawdown, we are increasing Navy's recruiting and advertising resources within the authority granted by Congress. The purpose of this initiative is to enable the recruiter increase programmed for FY 1987 to be on board and functioning at the beginning of FY 1987, rather than phased in during the year. This will increase the number of new contracts written in FY 1987 and will diminish the DEP drawdown accordingly. The modest growth in advertising, coupled with management controls and incentives, provide reasonable assurances that the Navy will obtain the necessary quality.

Question: What funding in this budget is specifically related to overcoming this unfavorable trend?

Answer: Initiatives requested in the budget which are needed to recruit Navy's FY 1987 accession requirements while diminishing the severity of the DEP drawdown are:

a. An increase of 518 recruiters and 172 support personnel provides resources to support FY 1987 accession requirements in an eroding recruiting environment while limiting the impact on the end-of-year DEP status. (+$3,941 thousand)

b. An increase of 117 additional General Services Administration (GSA) leased passenger-carrying vehicles to enable increased recruiter prospecting. (+$550 thousand)

c. An increase of 250 miles per month per passenger-carrying vehicle within existing vehicle fleet to provide increased recruiter mobility. (+$1,439 thousand)

d. An increase in recruiting support travel which supports travel and per diem for recruiter training, supervisory presence, audits/inspections, and intensified prospecting at locations remote from recruiting facilities. (+$2,416 thousand)

The budget initiatives listed above are those which impact most heavily on end-of-year DEP. Other initiatives requested in the FY 1987 President's Budget impact to a lesser extent on in-year DEP performance and to a greater extent on out-year DEP performance during declining population levels of young people. The following initiatives, also budgeted for FY 1987, are aimed at creating favorable impressions of the Navy to potential recruits and to those who influence their career decisions:

a. Increases are requested to expand the highly popular tours of small Navy bands to areas remote from any Navy presence and to expand Navy Band concert tours in support of recruiting into the midwest region of the contiguous United States. (+$676 thousand)

b. Increases are requested to expand exposure of Navy exhibit vans and public performances by the Navy Parachute Team and the Navy Balloon Team. (+$303 thousand)

SUBCOMMITTEE RECESS

Senator STEVENS. We will stand in recess until February 24 when we will have the overview of the Army budget. If we can possibly work out the Philippine hearings next week, we will do it.

Thank you very much.

[Whereupon, at 12 noon, Friday, February 21, the subcommittee was recessed, to reconvene Monday, February 24, 1986.]

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1987

MONDAY, FEBRUARY 24, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:00 a.m., in room SD–192, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, Andrews, D'Amato, Rudman, Cochran, Proxmire, Johnston, Byrd, and Sasser.

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY

STATEMENT OF HON. JOHN O. MARSH, JR., SECRETARY OF THE ARMY

ACCOMPANIED BY GEN. JOHN A. WICKHAM, JR., CHIEF OF STAFF, U.S. ARMY

OVERVIEW OF ARMY BUDGET REQUEST

BUDGET AND OUTLAYS

Senator STEVENS. Good morning.

The subject of our hearing today is the Army budget estimate for fiscal year 1987. The total request is $76.9 billion for Army programs that are covered in the Defense appropriation bill. This represents an increase of $5.1 billion over enacted appropriations and $7.4 billion, approximately 6 percent real growth, above the post Gramm-Rudman-Hollings sequestered baseline.

ESTABLISHMENT OF LIGHTER FORCES

Mr. Secretary, the budget you present today continues the process of establishing lighter forces tailored to meeting the low- to mid-intensity threat which many analysts think is the more likely challenge to our national interests.

Your statement refers to a 28-division force and expanded Special Operation Forces—all accommodated through more reliance on reserve components and better use of existing manpower. Hopefully, this type of management will keep down the cost of defense while meeting the threat. We are encouraged to see this type of action.

Personally and parochially, I am looking forward to the activation of the 28th Division—the 6th Infantry Division—in Alaska on March 23 and 24.

DEEP BATTLE SYSTEMS PROCUREMENT

Another initiative which we need to hear more about, to include the costs and schedule, is your efforts to procure effective deep battle systems.

COMPARATIVE STATEMENT OF BUDGET AUTHORITY AND STATEMENT OF UNOBLIGATED BALANCES

For the record we would like to have the Army submit a comparative statement of budget authority by appropriation account for fiscal year 1985 through 1987. Fiscal year 1986 estimates should reflect the post Gramm-Rudman-Hollings baseline. This display should include real growth calculations based on the latest economic indicators, by appropriation and in the aggregate.

In addition, we ask that the Army submit a statement of unobligated balances by account for the latest complete quarter and estimates for the end of fiscal year 1986.

[The information follows:]

BUDGET AUTHORITY & REAL GROWTH BY APPROPRIATION ACCOUNT

(Millions of Dollars)

	FY 1985	REAL GROWTH FY 85-86	FY 1986 Ajusted PL 99-177	REAL GROWTH FY 86-87	FY 1987
Military Personnel, Army	21,499.1	-7.1%	21,003.7	7.4%	22,655.0
Reserve Personnel, Army	2,027.9	0.8%	2,145.2	12.5%	2,432.0
National Gd Pers, Army	2,889.6	0.8%	3,056.8	13.3%	3,485.2
Opns. & Maint., Army	18,475.2	-2.5%	18,167.8	14.7%	21,341.9
Opns. & Maint., Army Res.	731.7	0.6%	741.9	4.6%	793.1
Opns. & Maint., Nat'l Gd.	1,437.5	8.7%	1,573.1	11.1%	1,786.9
Rifle Practice, Army	0.9	-6.6%	0.9	4.0%	0.9
Aircraft Proc., Army	3,941.5	-18.5%	3,351.5	-6.6%	3,264.7
Missile Proc., Army	3,167.0	-16.5%	2,762.0	-15.4%	2,438.2
Proc. of WTC&V, Army	4,504.4	-5.5%	4,447.2	-4.1%	4,452.6
Proc. of Ammo., Army	2,646.3	-13.6%	2,374.8	-8.4%	2,254.0
Other Procurement, Army	5,141.5	-6.6%	4,983.4	19.7%	6,169.0
RDT&E, Army	4,357.2	2.9%	4,606.4	16.6%	5,550.3
Military Const., Army	1,593.1	-6.6%	1,524.4	8.0%	1,695.2
Mil. Con., Army Nat'l Gd.	98.6	-5.3%	97.2	20.2%	121.1
Mil. Con., Army Reserve	69.3	-18.9%	58.3	43.5%	86.7
Family Hsg Const., Army	143.2	67.5%	249.2	80.1%	463.4
Family Hsg. Opns. & Debt	1,185.2	-9.3%	1,110.8	10.2%	1,269.6
Army Stock Fund	516.4	-30.0%	373.7	-23.7%	296.7
Offsetting Receipts, Army	(155.5)	0.0%	(266.0)	0.0%	(277.7)
Army Gen. Gift Fund	0.3	0.0%	0.2	0.0%	0.1
TOTAL BUDGET AUTHORITY	74,270.4	-5.7%	72,362.5	8.5%	80,278.9

The FY 1986 DoD Appropriation Act provided for the transfer of unobligated balances of prior year procurement accounts to accommodate the FY 1986 military pay raise and retired pay accrual. This understatement of the base in FY 1986 budget authority overstates the growth in the FY 1987 Military Personnel accounts. Also, reducing FY 1986 for PL 99-177 further overstates the growth in all appropriations.

UNOBLIGATED BALANCES BY ACCOUNT

The statement of unobligated balances by account as of 31 December 1985 follows. Army estimates that one-hundred percent of the annual accounts will be obligated as of 30 September 1986. Estimates for the multiyear accounts are the same as those reflected in the President's Budget.

	TOTAL AVAILABLE	UNOBLIGATED
MILITARY PERSONNEL, ARMY	21,078.2	15,514.3
RESERVE PERSONNEL, ARMY	2,178.6	1,783.9

	TOTAL AVAILABLE	UNOBLIGATED
NAT'L GUARD PERSONNEL, ARMY	3,066.6	2,434.0
O & M ARMY	18,975.5	13,838.2
O & M ARMY RESERVE	780.1	598.7
O & M ARMY NATIONAL GUARD	1,652.8	1,246.7
NAT'L BOARD FOR PROMO OF RIFLE PRACTICE	0.9	0.8
AIRCRAFT PROCUREMENT, ARMY		
86/88	3,524.2	2,951.7
85/87	793.9	635.0
84/86	247.7	168.2
MISSILE PROCUREMENT, ARMY		
86/88	2,904.3	2,437.2
85/87	800.9	635.5
84/86	265.9	218.4
PROC OF WEAPONS & TRACKED COMBAT VEH		
86/88	4,684.8	4,620.2
85/87	1,325.9	1,263.0
84/86	807.8	766.6
PROCUREMENT OF AMMUNITION, ARMY		
86/88	2,497.2	1,463.2
85/87	338.5	341.1
84/86	96.9	92.8
OTHER PROCUREMENT, ARMY		
86/88	5,275.6	4,544.7
85/87	1,568.8	1,359.3
84/86	528.1	478.8
RESEARCH, DEVEL, TEST & EVAL, ARMY		
86/87	4,798.2	3,642.1
85/86	4,365.9	365.2
MILITARY CONSTRUCTION, ARMY		
86/90	1,603.0	1,587.6
85/89	1,593.1	442.8
84/88	1,184.1	197.7
83/87	929.7	103.1
82/86	950.7	93.0
MILITARY CONSTRUCTION, ARMY RESERVE		
86/90	61.3	60.2
85/89	69.3	7.7
84/88	54.7	7.2
83/87	41.8	1.2
82/86	64.7	4.1

	TOTAL AVAILABLE	UNOBLIGATED
MILITARY CONSTRUCTION, ARMY NAT'L GUARD		
86/90	102.2	95.2
85/89	98.6	8.5
84/88	67.6	0.6
83/87	54.9	0.8
82/86	67.6	0.08
FAMILY HOUSING, O & M ARMY	1,168.0	827.9
FAMILY HOUSING, CONSTRUCTION, ARMY		
86/90	262.0	261.5
85/89	143.2	37.6
84/88	172.7	40.2
83/87	127.8	21.3
82/86	92.5	6.3

INTRODUCTION OF WITNESS

Senator STEVENS. On behalf of the subcommittee, we welcome you, Secretary Marsh and General Wickham.

Your prepared statements will be printed in full for the record. We ask you to highlight your budget initiatives in your opening statements. Senator Proxmire?

Senator PROXMIRE. No statement, Mr. Chairman.

Senator STEVENS. Senator Rudman?

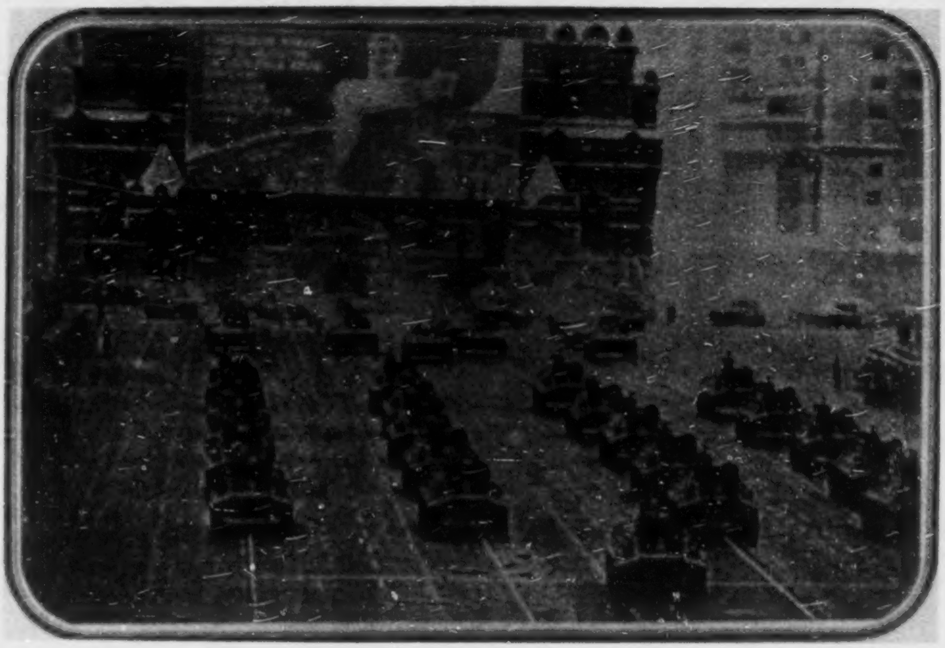
Senator RUDMAN. No, Mr. Chairman.

Senator STEVENS. We are happy to have you with us. I see you have a little show and tell. We look forward to those.

SOVIET WEAPONS SYSTEMS

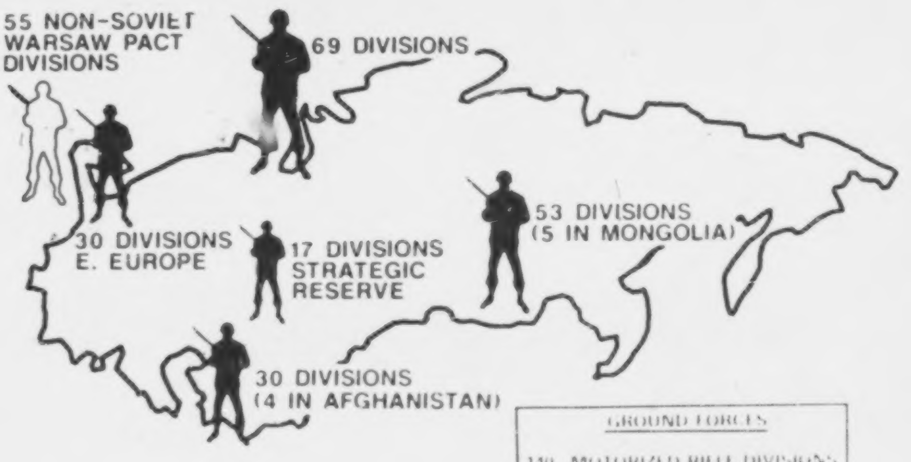
Secretary MARSH. Thank you very much, Senator Stevens. It is a pleasure to be here.

What I would like to do is to give you a very quick overview of some of the things that underlie the Army budget for 1987.



The Army budget in large measure is driven by the nature of the threat—the Soviet Union's use of military power to enforce its policies.

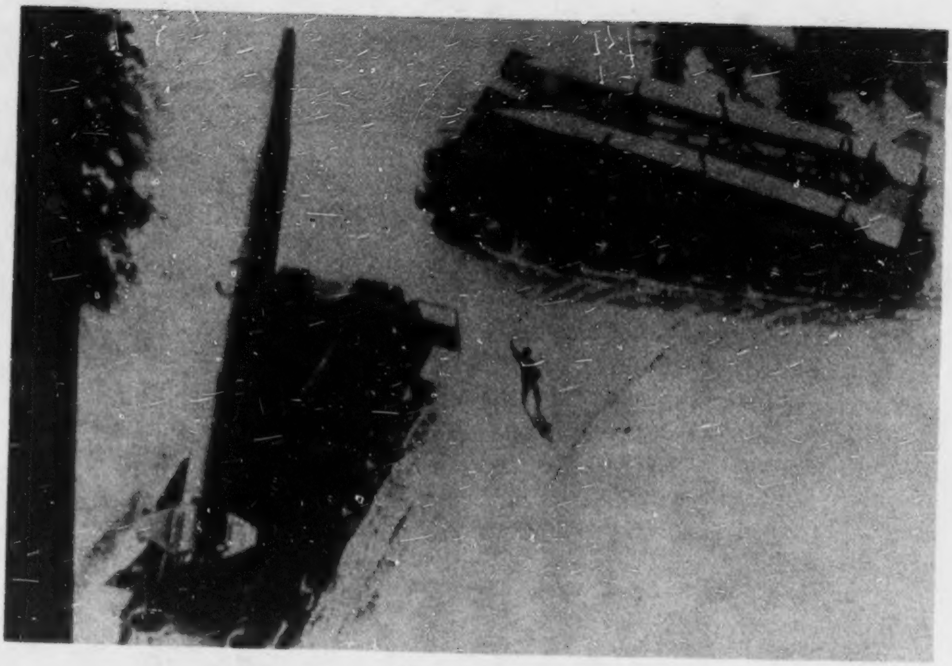
SOVIET GROUND FORCES



55 NON-SOVIET WARSAW PACT DIVISIONS
69 DIVISIONS
30 DIVISIONS E. EUROPE
17 DIVISIONS STRATEGIC RESERVE
53 DIVISIONS (5 IN MONGOLIA)
30 DIVISIONS (4 IN AFGHANISTAN)

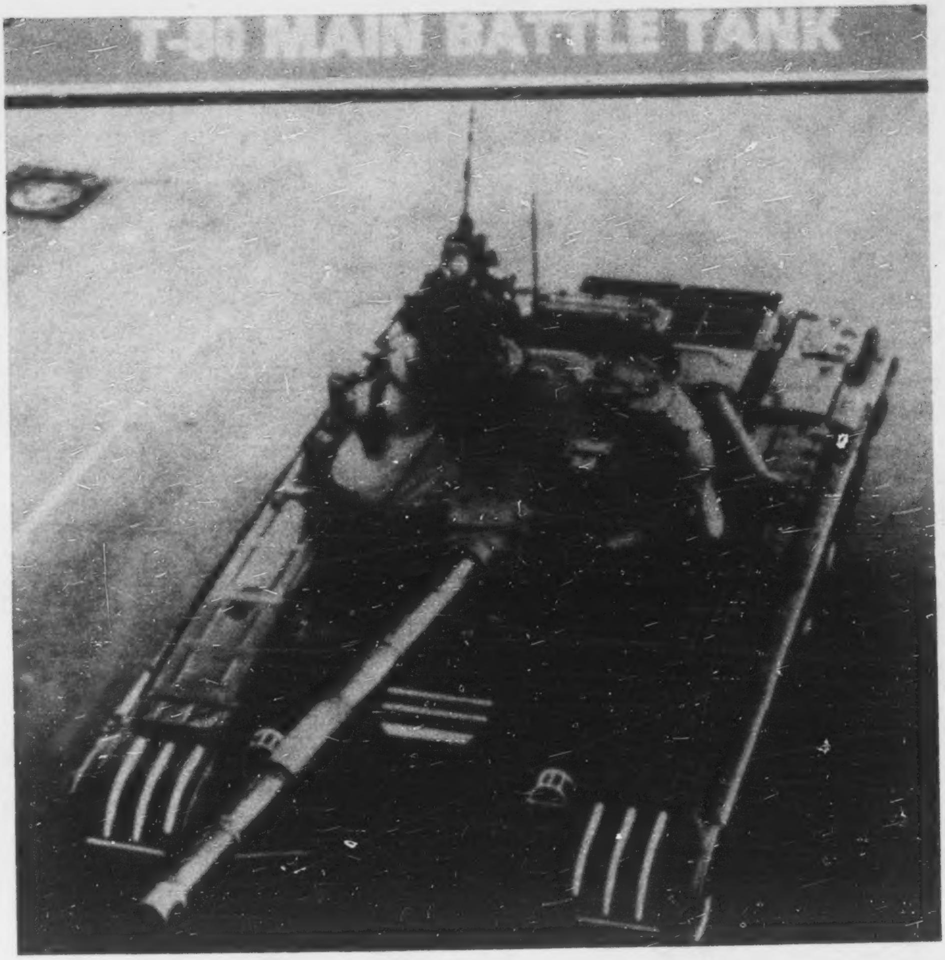
GROUND FORCES	
140	MOTORIZED RIFLE DIVISIONS
51	TANK DIVISIONS
7	AIRBORNE DIVISIONS
1	COASTAL DEFENSE DIVISION
199	DIVISIONS

The Soviets have 199 divisions. We find those in the Warsaw Pact, some in Afghanistan and some on the China border. It is this nature of the Soviet force structure that drives many of our programs.



Here you see, for example, the Soviet FROG 7, tactical surface-to-surface missile that has a range of 70 kilometers. The Warsaw Pact has fielded 500 FROG's and SS-21 launchers opposite the NATO forces.

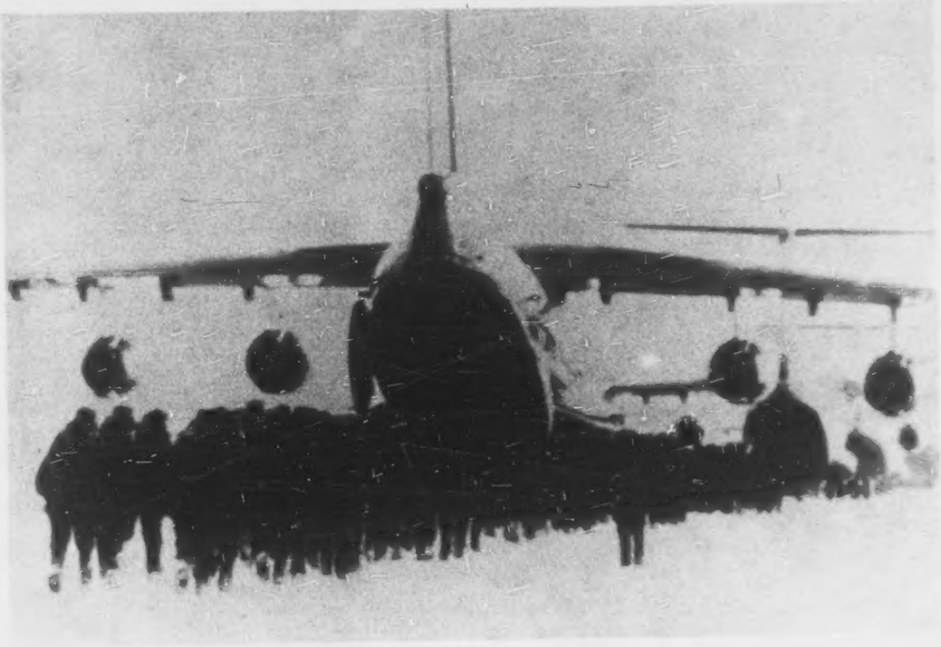
They have 52,000 main battle tanks. Here we see the T-64, a 125mm, smooth bore weapon system. 13,000 of those are in the Soviet inventory and that tank has never been exported outside the Soviet Army.


T-80 MAIN BATTLE TANK

Here is the T-72. The T-72 tank is a variation that came out of the 1970's and they produced 18,000.

This slide shows the latest T-80 tank. There are 3,500 of the T-80 tanks. The Soviets have the capability of producing a minimum of 2,500 tanks per year. Also they have a very significant array of Army personnel carriers.

Here you see the BMP. Their armored personnel carriers number 60,000, and 30,000 are directed toward NATO. This particular one will carry 11 personnel, a crew of three and eight riflemen. It has a 73-millimeter cannon on it.

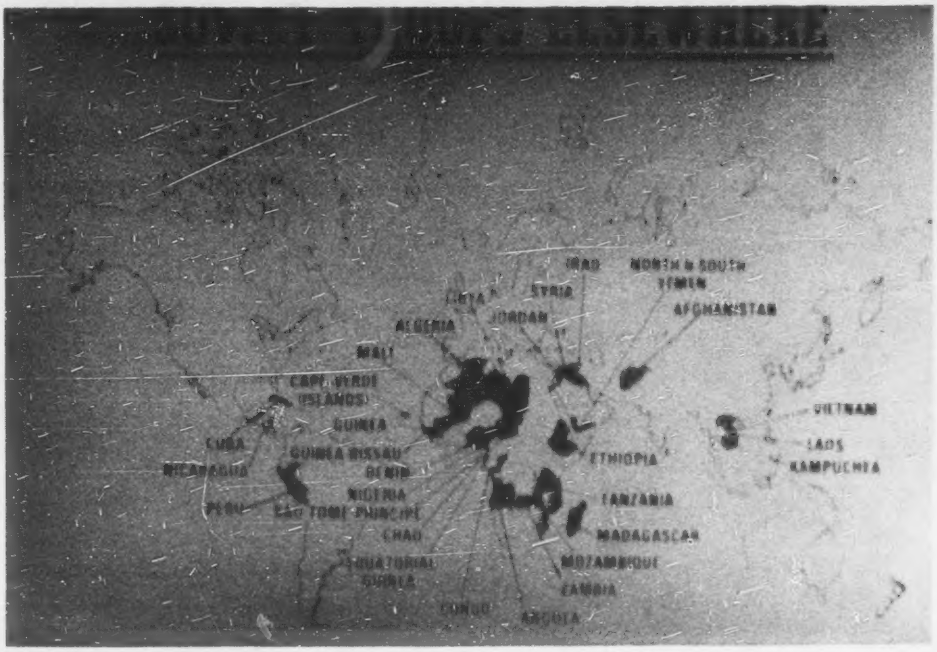


The Soviets have seven airborne divisions numbering 6,500 personnel in each division.

ZSU 23 4 SP AA GUN

They have not neglected their air defense system. Here you see the ZSU 23 which is a version of the gun system that was so effective in North Vietnam.

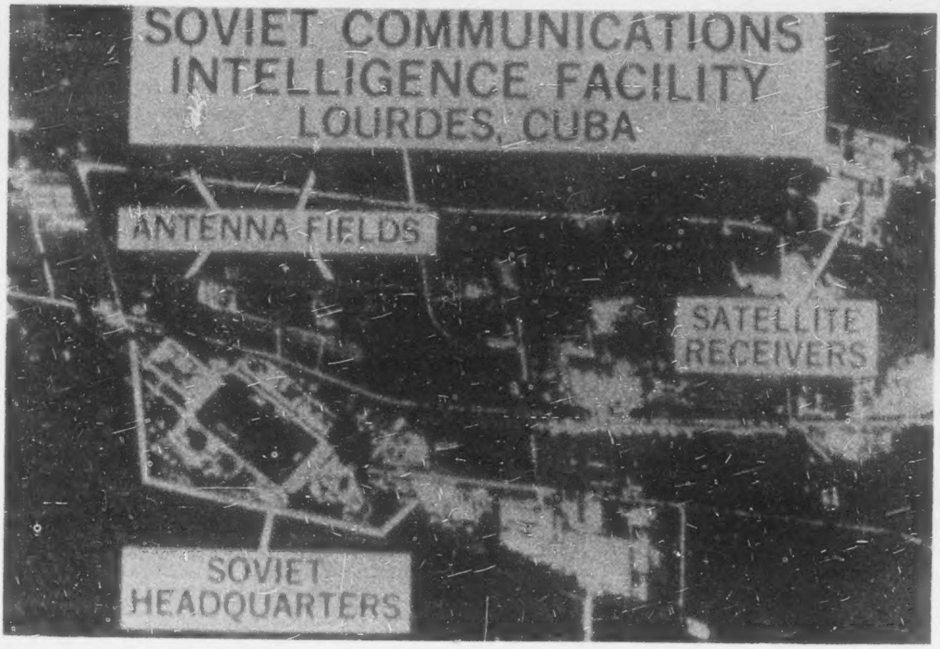
The HIND helicopter is one of the most heavily armed helicopters in the world. They have not been shy about extending its use to other parts of the world.


IRAQ
NORTH & SOUTH YEMEN
LIBYA
SYRIA
AFGHANISTAN
ALGERIA
JORDAN
MALI
CAPE VERDE (ISLANDS)
GUINEA
CUBA
GUINEA BISSAU
NICARAGUA
BENIN
NIGERIA
PERU
SAO TOME PRINCIPE
CHAD
EQUATORIAL GUINEA
CONGO
ANGOLA
ETHIOPIA
TANZANIA
MADAGASCAR
MOZAMBIQUE
ZAMBIA
VIETNAM
LAOS
KAMPUCHEA

We estimate there are 20,000 Soviet personnel associated with their foreign military sales program.

AFGHANISTAN

Here in Afghanistan we find better than 115,000 combat troops engaged in combat. However, it is not just in Afghanistan we find their adventurism.


SOVIET COMMUNICATIONS
INTELLIGENCE FACILITY
LOURDES, CUBA
ANTENNA FIELDS
SATELLITE RECEIVERS
SOVIET HEADQUARTERS

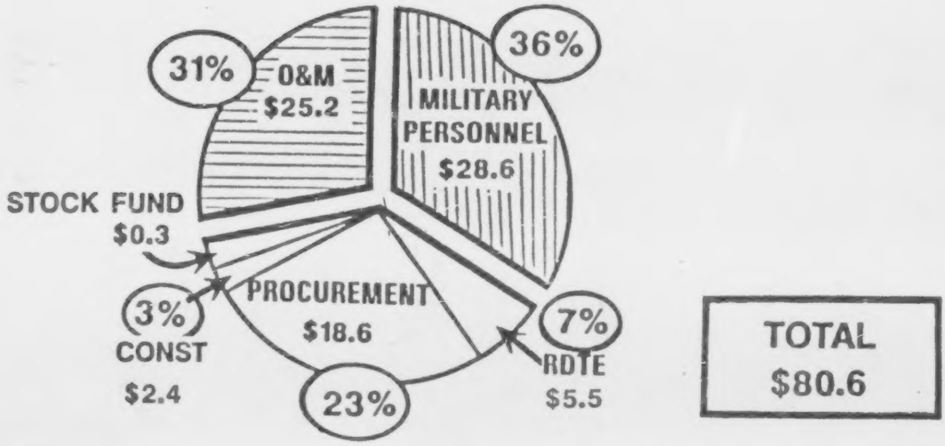
Here is a picture of the Soviet intelligence collection station in Cuba, not far from Havana.

In Central America we find the introduction of the Soviet T-54 tanks and better than 100 of those in Nicaragua. In Nicaragua you will find the MI-8 Soviet helicopter that transports 26 people.

When you look at the budget for the Army, you will find it is centered around the Army soldier. Ninety percent of our soldiers are in the upper two-thirds mental category of the Armed Forces qualification test.

FY 87 TOA

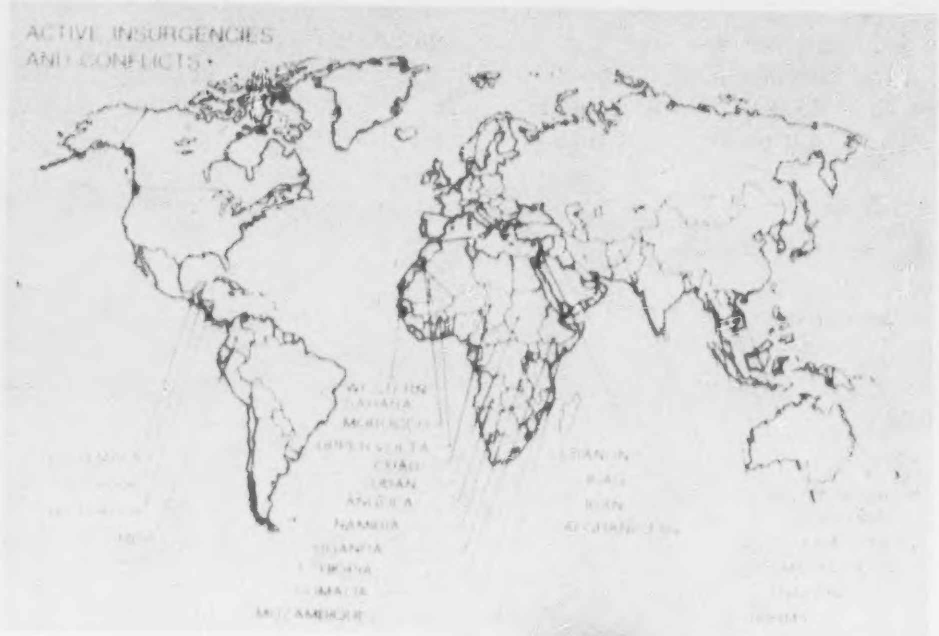
(TOA $ IN BILLIONS)



The Army budget breaks down for military personnel into $28.6 billion, 36 percent of the budget. Seven percent goes to research and development, 23 percent to procurement, 5 percent goes to MILCON, $3.6 billion. In operation and maintenance, $25.2 billion or 30 percent.

I want to call your attention to the figures in blue. You will see over $10 billion of that budget, 13 percent, will go into the Reserve Component. Although we have concentrated our focus on the threat, we have not neglected our heavy forces.

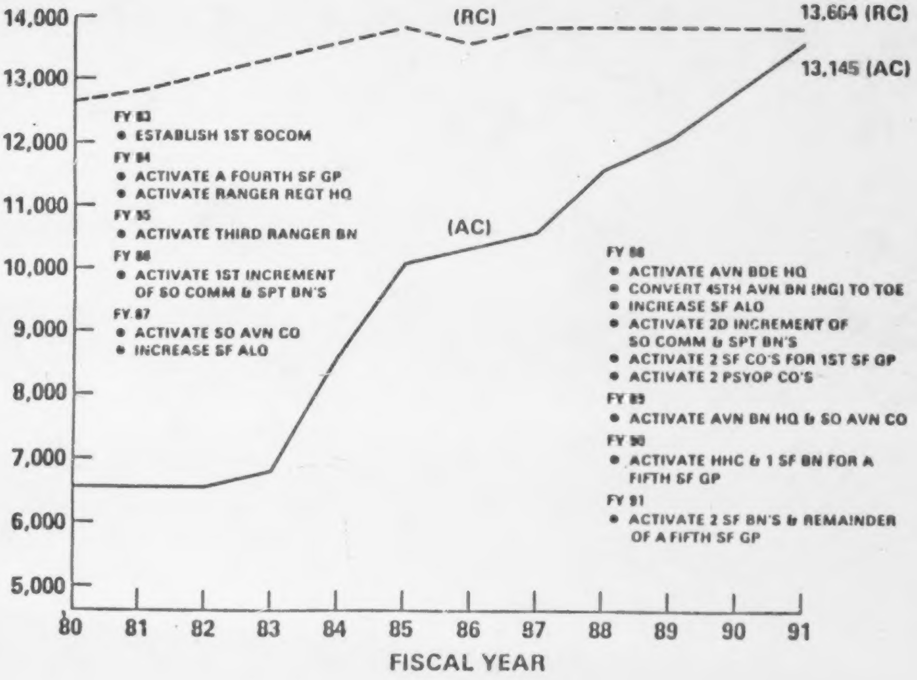
Of the Army's 21 heavier divisions, 12 are in the active force and 9 are in the National Guard. There will be six lighter divisions in the active Army, with one additional light division in the National Guard.


ACTIVE INSURGENCIES
AND CONFLICTS •
WESTERN
SAHARA
MOROCCO
UPPER VOLTA
CHAD
SUDAN
ANGOLA
NAMIBIA
UGANDA
ETHIOPIA
SOMALIA
MOZAMBIQUE
LEBANON
IRAQ
IRAN
AFGHANISTAN

If you look at the world today, you will see there are conflicts and insurgencies being waged in 22 countries of the world. That type of conflict makes it necessary to develop our light forces.

This is the background for establishing the light division. General Wickham is the architect of that.

SOF FORCE STRUCTURE IMPROVEMENTS

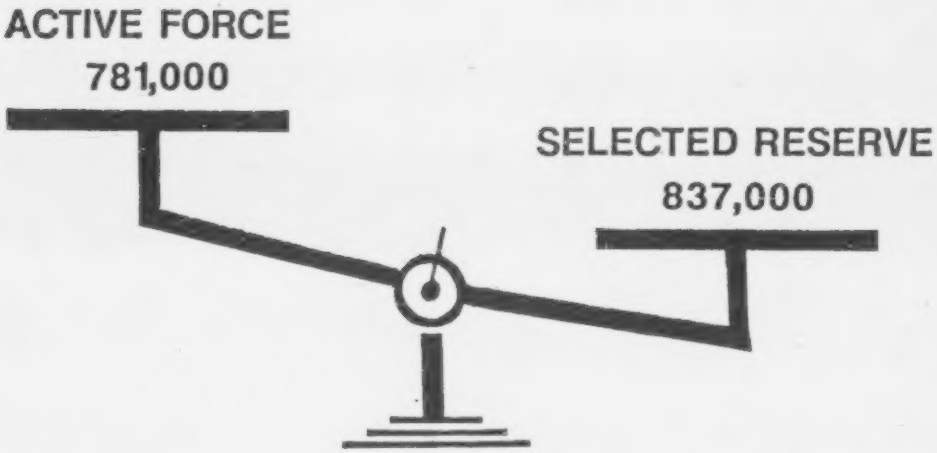


Second, you will see we have ramped up very significantly our Special Operations Forces—SOF—strength, moving from 5,500 to better than 13,000 by the year 1991. This will mean four groups in the Active Component and a fifth group in 1991.

It also means a Ranger headquarters for the three Ranger battalions already in being.

BALANCE OF US ARMY FORCES

FY91



ACTIVE FORCE
781,000

SELECTED RESERVE
837,000

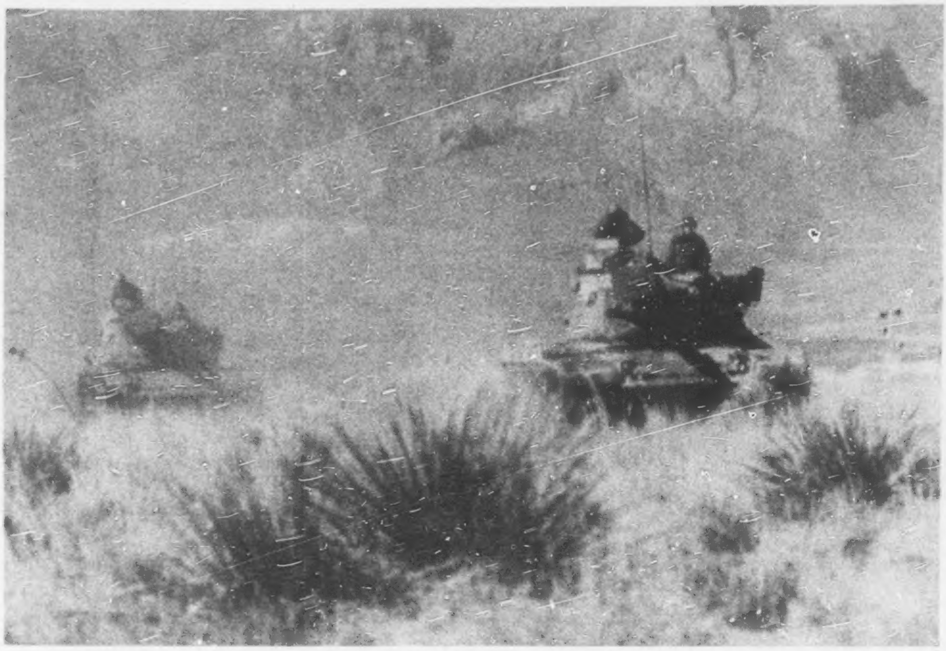
We also have a significant capability in the National Guard and Reserve. I call your attention to the balance here. This year in the Army there will be one active soldier to each one in the Reserve component.

Last year 27,000 National Guard and Reserve soldiers were deployed outside the United States. In Panama, 10,000 National Guardsmen from 10 States built 26 miles of road.

In the coming year over 30,000 Guard and Reserve soldiers will be deployed outside the United States. Just recently 4,500 National

Guardsmen from the State of Wisconsin returned from exercises in Western Europe.

General Wickham will tell you more about the readiness achievements he has been able to attain in the Army.



I want to mention to you the importance of the National Military Training Center because of the tremendous capability it is giving us. One of the things that we stress there because we do this type of training is using passive protective measures for chemical warfare.

We want to emphasize our continuing need for a binary munitions production capability.

ILITARY AIRLIFT COMMAN

There are two areas in which we have great need. One is a continuing need for aircraft. We are short of airlift capability.

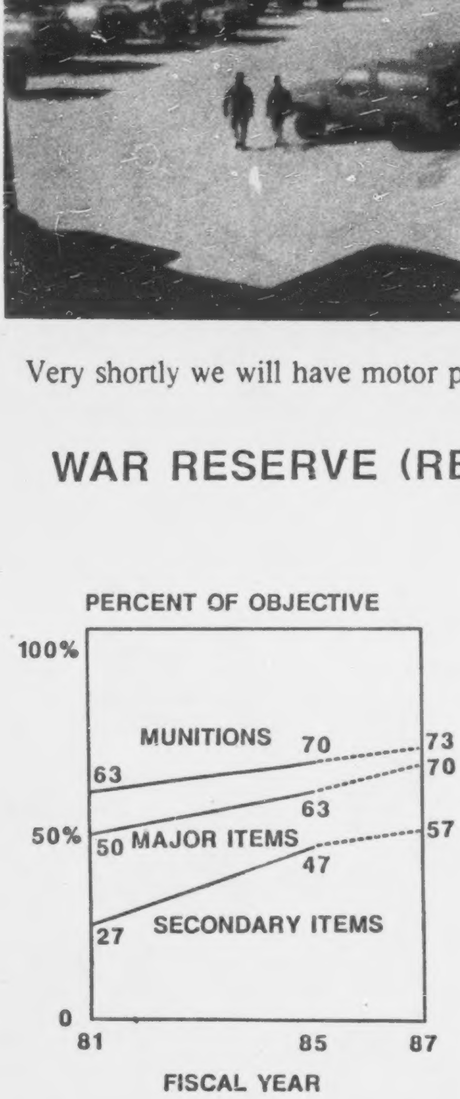
Second, we are short in sealift capability.

The National Guard unit I spoke about from Wisconsin moved by ships from Baltimore.

Looking at our modernization program very rapidly, you will see scenes like this of the tank motor parks in Germany which formerly existed. That scene is being corrected in many areas of the world.

Very shortly we will have motor parks that will look like that.

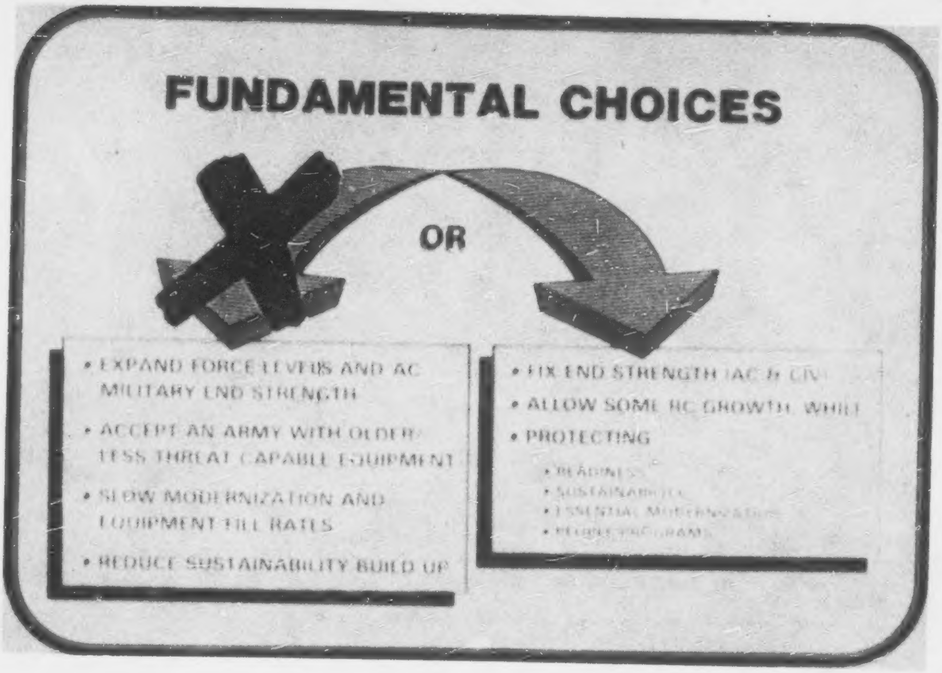
WAR RESERVE (RESUPPLY) STOCKS



- ON HAND STOCKS COMPARED TO FY 88 DEFENSE GUIDANCE
- STAYING POWER INCREASED SUBSTANTIALLY
- MAJOR ITEMS
  - TANKS
  - TRUCKS, ETC.
- SECONDARY ITEMS
  - ENGINES
  - AXLES, ETC.

If you look at the sustainability, one of the four pillars of our defense, you will see the continued increase of our war reserve stocks. General Wickham will speak further on this.

In the area of force structure, 5 years ago the Army made a decision that it would cap active end strength at 781,000.



FUNDAMENTAL CHOICES

OR

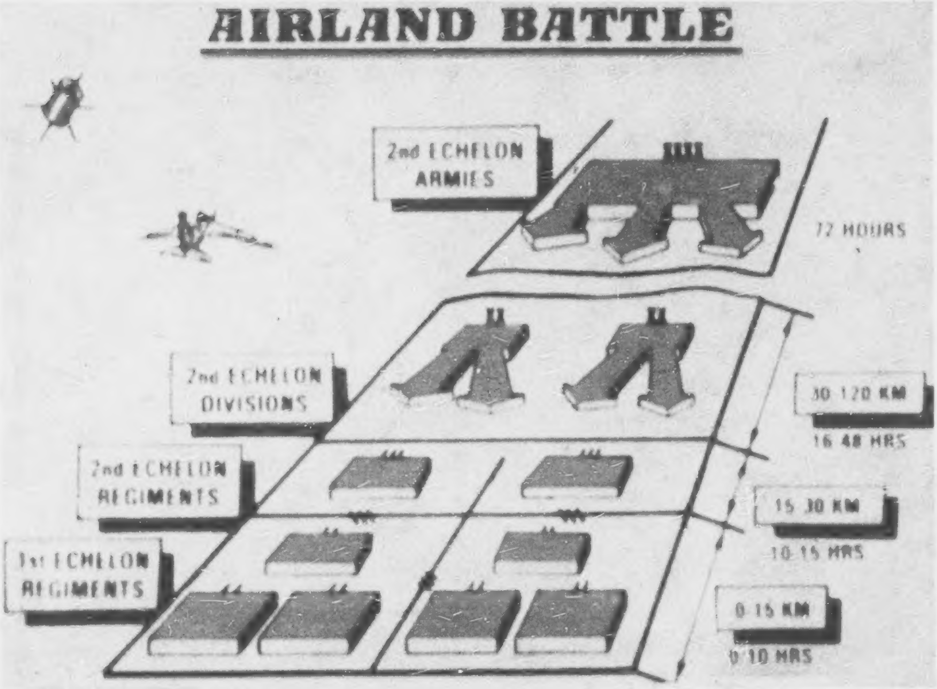
- EXPAND FORCE LEVELS AND AC MILITARY END STRENGTH
- ACCEPT AN ARMY WITH OLDER/ LESS THREAT CAPABLE EQUIPMENT
- SLOW MODERNIZATION AND EQUIPMENT FILL RATES
- REDUCE SUSTAINABILITY BUILD UP

- FIX END STRENGTH (AC & CIV)
- ALLOW SOME RC GROWTH, WHILE
- PROTECTING
  - READINESS
  - SUSTAINABILITY
  - ESSENTIAL MODERNIZATION
  - PEOPLE PROGRAMS

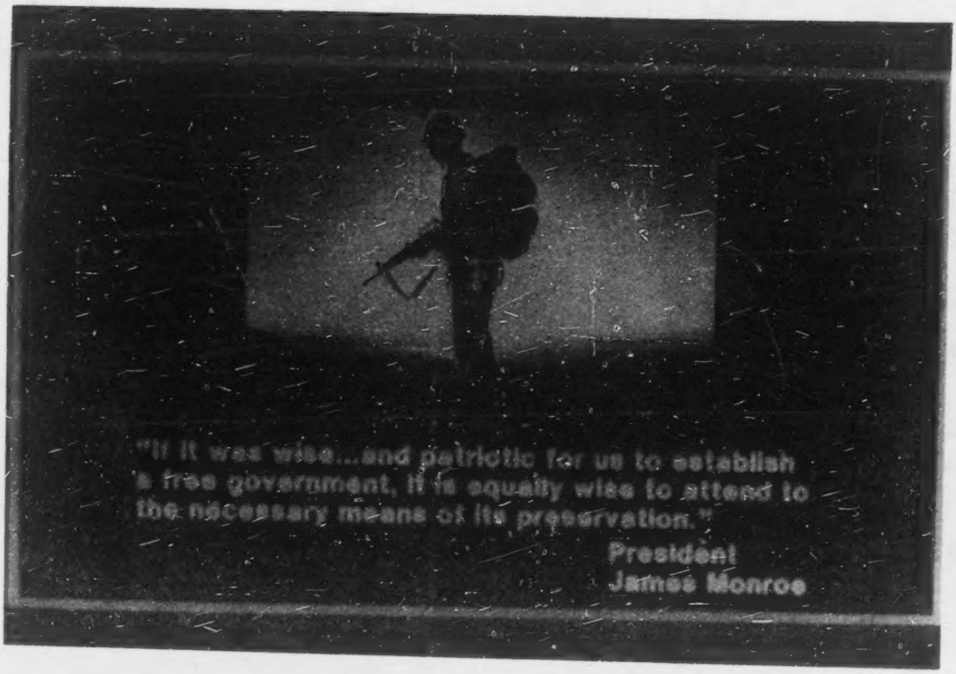
Concentration would be made on modernization initiatives of forces and leadership and technology to make a highly effective force, albeit smaller.

Two years ago we decided to stabilize the civilian employment at about 410,000.

The reason we have done so is to concentrate on efforts to modernize and develop the force accompanying our doctrine used for the deep battlefield. These caps force us to look to technology and productivity.


AIRLAND BATTLE
2nd ECHELON ARMIES
72 HOURS
2nd ECHELON DIVISIONS
30-120 KM
16-48 HRS
2nd ECHELON REGIMENTS
15-30 KM
10-15 HRS
1st ECHELON REGIMENTS
0-15 KM
0-10 HRS

AirLand Battle concept envisions how the Soviets will engage in conflict. They will use a technique of echelons of Army, divisional units, regiments and battalions. Consequently, it is vital that we see deep and use the deep strike team. That lays a great emphasis on modernization and concentration and technology.



"If it was wise...and patriotic for us to establish a free government, it is equally wise to attend to the necessary means of its preservation."

President
James Monroe

Finally, James Monroe said: "If it was wise and patriotic for us to establish a free Government, it is equally wise to attend to the necessary means of its preservation."

We appreciate very much the support we have gotten from the committee traditionally. It is a pleasure to be with you.

[The statement of Secretary Marsh follows:]

PREPARED STATEMENT OF JOHN O. MARSH, JR.

SECRETARY OF THE ARMY

A review of the history of the wars in which this Nation has been embroiled during this century highlights the importance of conventional deterrence and war fighting capability. The Army is the cornerstone of our conventional capability. As it is land forces that can exert decisive control over people, resources, and territory, the Army serves as the centerpiece of national will to deter, and, if necessary, defeat an adversary. Furthermore, as we view the spectrum of possible conflicts, the need for a strong conventional force becomes increasingly the focus of our effort.

The Soviet Union's ground forces are the predominant source of their conventional capability. Last year I reported to you that the Soviet Union had 194 divisions. This year I report to you they have 199 divisions. While not all these divisions are of the same caliber, the fact remains that they continue to expand their force. Nearly 40 of these divisions are stationed outside the Soviet Union, including 4 in Afghanistan. Furthermore, with nearly three times the percentage of GNP devoted to defense compared to the United States, the Soviet Union continues to outproduce the United States in critical combat systems such as tanks by over three to one. Their new equipment is highly capable, incorporates modern technology, and dictates the need to sustain our modernization efforts to obtain parity.

The unique geographic location of the Soviet Union allows them to project land forces into Europe, Asia, and the Middle East without crossing a major body of water. This capability, coupled with their blue water navy, has enabled the Soviets to project their military power and aggressive intentions globally. Their willingness to porject ground combat forces is demonstrated in Afghanistan, which I already mentioned, where over 115,000 Soviet soldiers occupy the country. In our own hemisphere we know that the Soviet Union has combat forces in Cuba and more advisors in Peru than we have in all of Central America.

Even without the global Soviet presence and the active involvement of their surrogates, the Third World would be replete with instability and rivalries. There are over 20 active insurgencies and conflicts world-wide and numerous other nations with fragile political systems that are struggling to survive. Many of these insurgencies and conflicts and their attendant forms of violence like terrorism are fueled by Soviet arms. Furthermore, activism by the Soviets and their surrogates threaten other nations seeking to develop viable economic and political infrastructures. Many of these nations look to us for assistance in their efforts to develop systems that support democratic values.

These realities of the world in which we live are a key factor in shaping the Army today. The Army must be prepared to respond to potential challenges across the full spectrum of conflict. We must continue to uphold our vital interests in areas of traditional concern, and we must be prepared to combat more recent threats that challenge our interests globally. We must have forces capable of deterring and defeating the higher intensity threats that continue to grow in sophistication and extent. And, we must have forces capable of responding globally to the more likely low-intensity threats that pose an equal challenge to our national interests.

Our AirLand Battle Doctrine provides the framework to develop war fighting capability to overcome quantitative weaknesses of our forces and answer the challenge across the conflict spectrum. AirLand Battle takes advantage of national strengths in the quality of our people and the innovativeness of our society. Our modernization and procurement program is driven by this doctrine. Speed, maneuverability, and the massing of combat power at critical points are the keys to success with this doctrine. Effective communications, rigorous training, and initiative by soldiers and leaders are paramount.

To meet the challenges at the lower end of the conflict continuum, we are restructuring our forces to develop rapidly deployable forces, capable of sustained, vigorous combat. The creation of our light divisions and the expansion of Special Operations Forces highlight this effort. The light division is capable of responding to a global crisis in about one-third the time using one-third the airlift sorties of our extant infantry divisions.

This rapid response capability not only serves as a viable deterrent to global threats, it enables us to position substantial war fighting capability to control threats early in a crisis, and possibly forestall the need for additional forces. With augmentation, these light infantry forces are capable of fighting anywhere our interests are threatened to include Western Europe. Our revitalization of Special Operations Forces reflects the growing threat from terrorism and other low intensity conflicts. These forces are specially designed for limited objective operations. They demonstrated their flexibility in Grenada in 1983 by rapidly responding and projecting U.S. forces to support our interests.

These factors and the decision General Wickham and I made several years ago to hold active end strength constant to protect readiness, sustainability, and essential modernization are the key factors forging the Army. This fundamental decision considered demographic and fiscal factors and led to our initiatives to increase the reliance on, and capability of, the Reserve Component. The Army relies more than ever before on the Reserve Component. We have focused the Guard and Reserve on appropriate missions and are providing them the support to meet their wartime commitments. Today they are full partners in the Army mission of deterring war.

The fiscal year 1987 budget request of $80.6 billion continues the balance we have established in the personnel, operations and maintenance, and investment accounts. This balance is designed to attract and retain quality soldiers, and provide them the support, training, and modern equipment needed on today's and tomorrow's battlefields. Furthermore, with 13 percent of the request targeted toward the Reserve Component, this budget manifests commitment to these critical forces.

The decision to hold active strength constant to focus on readiness, sustainability, and modernization has proven wise. With the support of the members of this committee, we have an Army today that is far more ready to meet the diverse threats we face. Over 90 percent of our active accessions are high school graduates. This is 36 percentage points more than five years ago. And, while increasing Reserve Component strength, we have also increased the quality of our RC accessions. Over 80 percent of our incoming Reserve soldiers are high school graduates. We continue to meet and exceed our recruiting goals. Educational benefits have provided incentives needed to attract and retain talented young Americans.

We are midstream in our modernization effort. Since 1980, over 100 battalions and companies have fielded modern equipment such as the Bradley Fighting Vehicle, Abrams tank, Patriot Air Defense System, Multiple Launch Rocket System, and Black Hawk helicopter. We are now fielding the first Apache attack helicopter units and will soon field the Mobile Subscriber Communications equipment. With the increased mission responsibilities of the Army National Guard and Army Reserve, we have accelerated equipment distribution to them under the "first to fight, first to be equipped" principle. Some early deploying Reserve units already have Abrams tanks, Bradleys, and Black Hawks. Others are scheduled to receive these systems soon. This modernization provided over $1.5 billion of equipment to the Reserve Component last year and we plan to provide over $2.0 billion in FY 87.

We must continue this pace if we are to regain the qualitative edge we need to attain the leverage to fight out-numbered and win. One of our most pressing needs is to acquire the capabilities to provide air defense for our combat forces. The threat is sophisticated, but we have a sound plan to develop a fully integrated system of air defense protection. In the area of chemical deterrence, we have taken the first step to develop a realistic chemical retaliatory capability. However, our deterrent capability will remain inadeuqate until modern chemical retaliatory munitions are fielded. I urge your continued support of binary munitions. Finally, given the massive offensive capability and doctrinal employment of Soviet forces, we must attain the capability to see, fix, and attack deep. To accomplish this we must take advantage of technologies that offer us the opportunity to influence the battlefield markedly. And, we must continue to explore the possibilities of technology through a vigorous research and development program.

Tough, realistic, and effective training is the cornerstone of readiness. Our expenditures on training facilities, devices, and simulations have increased over 500 percent in the past six years. The National Training Center is an excellent example. Since its inception in 1980, we have progressed to a training rate of 28 combat maneuver battalions annually. It is the most challenging, realistic training in the world. It shows the ability of simulation and training devices to increase the training levels of the Army. Furthermore, some of our newest aviation and tank training simulators pay for themselves in three years or less. They challenge soldiers and provide cost effective and realistic training.

Our Reserve Components are integrated into these National Training Center cycles as well as into our overseas deployments. During the last year, for example, armor units from the Texas Guard deployed to Honduras and the 32d Infantry Brigade from Wisconsin deployed on this winter's REFORGER exercise in Germany. Army Reserve units from the 81st ARCOM and 121st ARCOM provided engineer support in Panama. These exercises lead to improved readiness for our National Guard and U.S. Army Reserve.

In addition to across the board increases in war reserve stocks, since 1980 we have more than doubled our materiel in unit sets of equipment prepositioned overseas. These improvements not only show our resolve to support allies in critical theaters, they also greatly reduce our global sea and air lift requirements and response time. We have also made great progress in our efforts to develop host nation support agreements with our allies These are cost effective initiatives that improve our war fighting capability. Our Individual Ready Reserve has increased to over 300,000. We have begun to initiate musters to improve the readiness of this element of our Reserves, the largest category of pre-trained manpower available during a mobilization.

Despite the cap on active strength, this year's activation of the 6th Infantry Division (Light) in Alaska will mark the fourth new division, three of which are light divisions, since 1980. One of those new light infantry divisions is the 29th Division (Light) in the Army National Guard formed from units in Maryland and Virginia. With the conversions of two other divisions to the light infantry design and the ongoing streamlining of armored and mechanized divisions to reflect AirLand Battle Doctrine, we will achieve the necessary balance in our 28 division force. Efforts to strengthen Special Operations Forces will continue. We have activated a fourth Special Forces Group and a Ranger Regimental headquarters for the three Ranger battalions. In light of their global missions, we are enhancing SOF communications and support capability and the FY 87 budget supports improvements in SOF aviation. As you know, many of our SOF units, particularly civil affairs and psychological operations units are in the Reserves, and they will continue to provide the majority of soldiers. We need your support to maintain the balance we are achieving between Active and Reserve Components, heavy and light units, combat and support capability, and forward deployed and U.S. based forces.

Our Army today is ready and capable. It is responsive and relevant to the world situation. We are also responsible stewards of the resources with which you entrust us. All of you are familiar with the many stories, most of which we discovered ourselves, about waste, abuse and unwarranted price escalation. Each year we provide Congress the Selected Acquisition Report required by the Nunn-McCurdy Amendment. My first report to the Congress five years ago showed considerable cost increase in several systems. Since that time, the number of systems reported has increased 33 percent and their value has increased to over $100 billion. However, none of the increase is due to cost growth. All the systems reported our of tolerance five years ago are now on track. The initiatives to award multiyear contracts, when appropriate, have been a significant factor in reducing costs. This year we are proposing new multiyear contracts for the Stinger missile and the Patriot Air Defense system. We are acquiring equipment for our soldiers in a sensible, businesslike manner. We have moved vigorously to push competition where it makes sense. This past year nearly $15.0 billion, or just under 47 percent of our procurement dollars were awarded competitively. We plan to increase the percentage to 50 percent this year. And, we are prosecuting those who defrauded the government. We recovered over $3 million last year and took actions against well over 100 contractors. We have created a Fraud, Waste and Abuse Task Force consisting of some of the principals of the Secretariat and Army Staff to assist in these efforts. We understand our responsibilities and are executing them.

Finally, I want to discuss our FY 87 request for $80.6 billion dollars in Total Obligation Authority. As you know it is part of the Defense Budget that is the middle year of our 0-3-3 agreement. It does represent real growth for the Army over last year, but, taken in the context of all Army budgets from 1970 to the present, still leaves the Army with a real decline over that period. During these same years we have watched North Vietnam swallow the South, then Laos and Cambodia; the advent of communist regimes in Angola and Ethiopia; the invasion and occupation of Afghanistan; the development of a Cuban-Soviet supported regime in Nicaragua to our south; and a massive increase in the quality and quantity of Soviet forces and weapons pointed toward our friends and fueling terrorism and instability throughout the world. Now is not the time to turn back. Reductions in our requested programs will have significant impacts, particularly when combined with the cuts in FY 86, causing negative consequences for our deterrence and war fighting capabilities. We must continue the progress in long overdue modernization. We must continue to attract and retain soldiers with the needed skills, spirit, and dedication. With your support we can continue to build an Army that is ready, responsive, and responsible.

STATEMENT OF GEN. JOHN A. WICKHAM, JR.

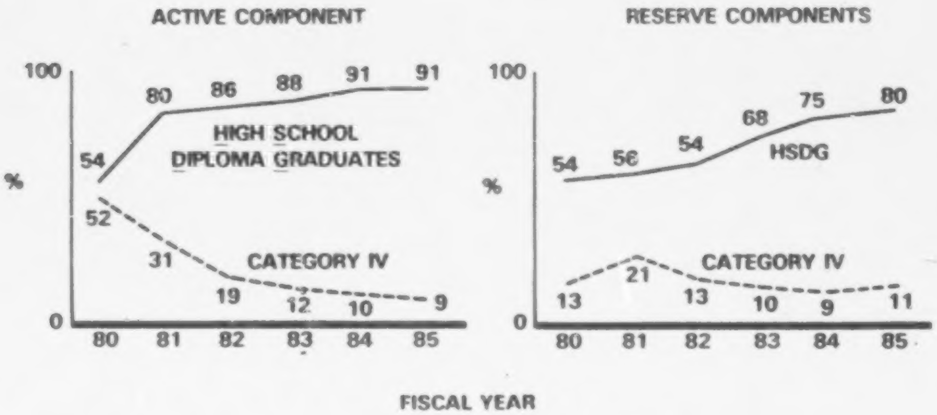
VISION FOR THE ARMY

- QUALITY SOLDIERS & STRONG FAMILIES
- FLEXIBLE, MODERN FORCE FOR CONFLICT SPECTRUM
- HIGH TECHNOLOGY AND PRODUCTIVITY ENHANCEMENTS
- AIRLAND BATTLE DOCTRINE
- JOINT AND COMBINED CAPABILITIES
- TACTICAL AND STRATEGIC DEPLOYABILITY
- STEWARDSHIP

General WICKHAM. I will tell you about the vision we have of the Army and touch on the quality of our soldiers, the best I have seen in

36 years of service; flexible structure, which the Secretary and you emphasized; high technology; AirLand Battle Doctrine; joint and combined capabilities; the need to improve our capability to deploy our forces strategically because of the lift shortfall and, of course, stewardship and resources.

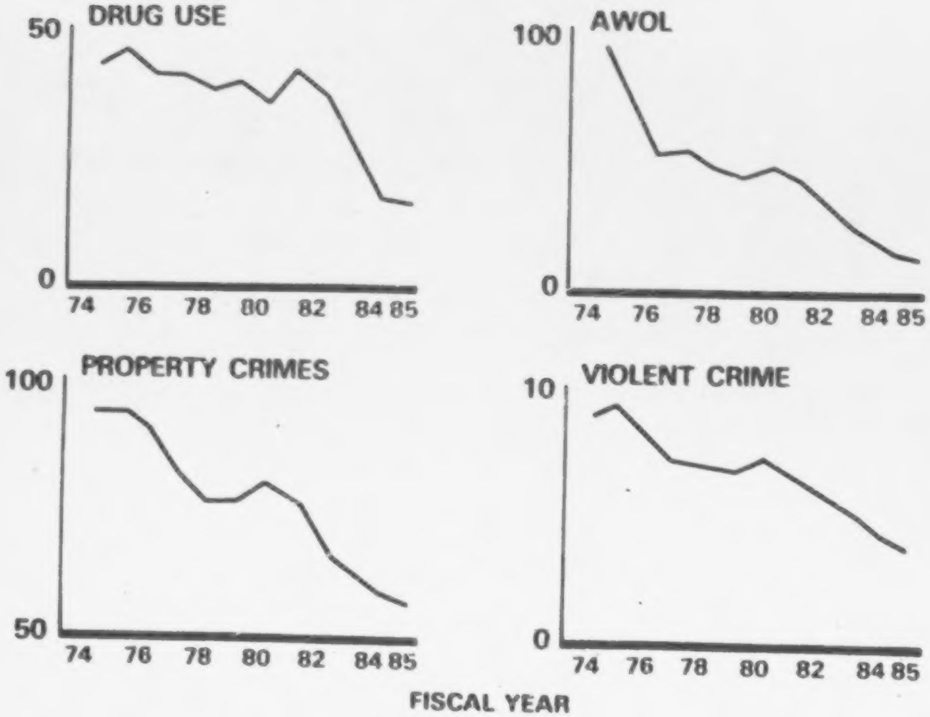
QUALITY SOLDIERS



First, let me tell you about our quality soldiers. We are still bringing in the best soldiers that we can, over 91 percent high school diploma graduates, and roughly comparable to that in the Reserve Component.

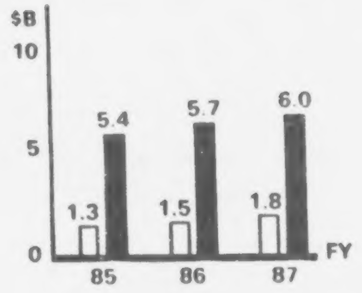
DISCIPLINE IN THE ARMY

(RATES PER 1000)



The category four enlisted is at the lowest level in 8 years. I emphasize our low rates of indiscipline; these are the best soldiers I have seen in 36 years.

QUALITY OF LIFE PROGRAMS



▯ FAMILY PROGRAMS
■ TOTAL QUALITY OF LIFE PROGRAM

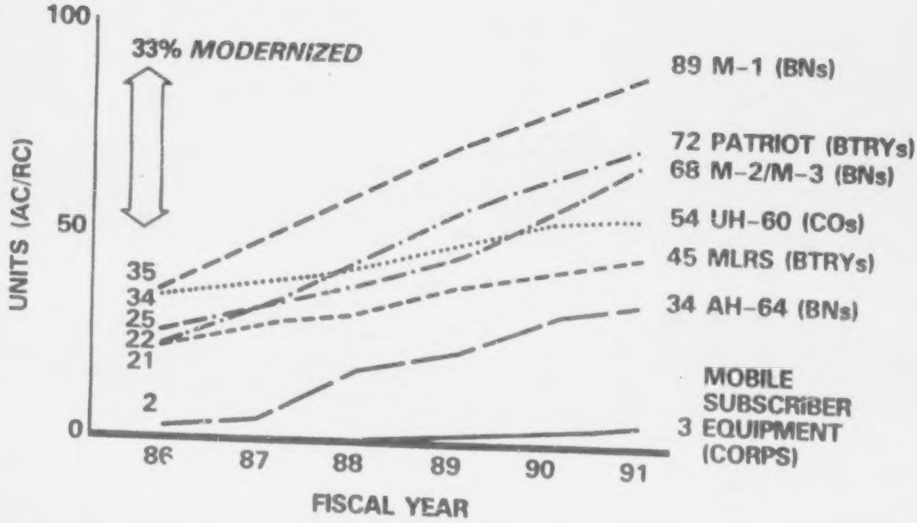
- HOUSING
- LIVING AND WORK PLACE
- CHILD DEVELOPMENT
- COMMUNITY SUPPORT
- REPAIR & MAINTENANCE
- YOUTH ACTIVITIES
- SOLDIER/FAMILY SVCS

QUALITY SOLDIERS, STRONGER FAMILIES . . . A MORE READY ARMY

We are also taking care of our families because the better the family feels about the Army, the better the soldiers are for readiness. Thanks to the Congress and the support you have given us, we have improved conditions for the families here as well as the total dimension of soldiers.

Secretary Marsh showed you some of the facilities we have been able to build.

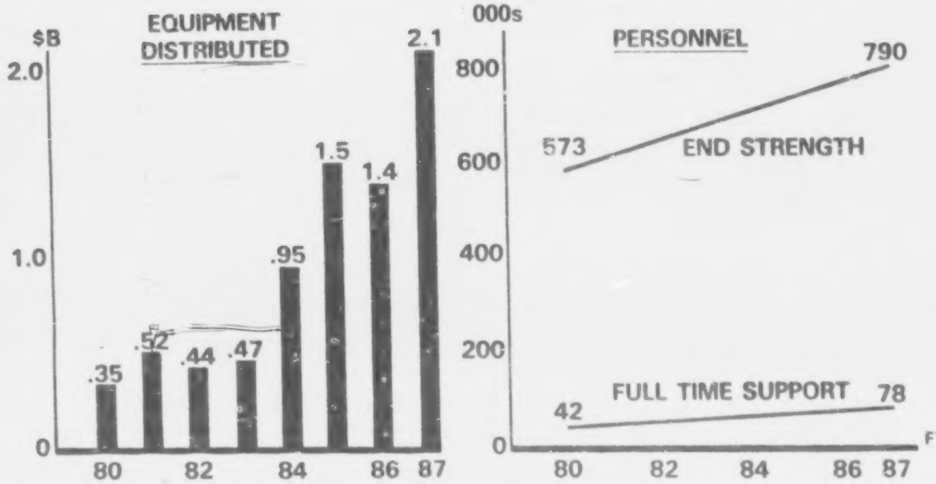
UNIT MODERNIZATION



Let me tell you what we have done with modernization. We are only partway there. We are first modernizing the high side of the Army, the European side of the Army. The rest of the Army is basically the low side using older equipment. The Army is only a third of the way there with Bradley Fighting Vehicle battalions, Black Hawk companies, Multiple Launch Rocket system batteries at Corps level and signal equipment, such as cellular phones on the battlefield.

The important message is the Army, unlike the other services, began modernization a little bit later and still has a long way to go in terms of modernizing units.

RESERVE COMPONENTS

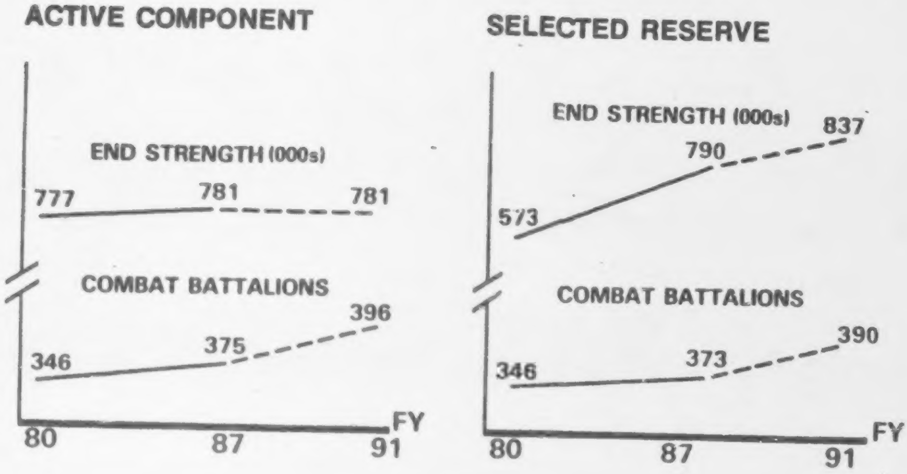


. . . FIRST TO FIGHT

. . . FIRST TO BE EQUIPPED

What are we doing with the Reserve Component? First is the kind of resources we are putting into the Reserve Component. Upwards of $1½ billion in new equipment, growth in terms of end strength, growth in terms of full-time support. The brigade that went over to—return of forces to Europe—REFORGER from Wisconsin is a dimension of that.

GROWTH OF COMBAT CAPABILITY



INITIATIVES

- ***PRODUCTIVITY ENHANCING TECHNOLOGY***
- ***ORGANIZATIONAL MODERNIZATION***
- ***HEADQUARTERS REDUCTIONS***
- ***RESERVE COMPONENT GROWTH***
- ***CIVILIAN SUBSTITUTION, CONTRACTING***
- ***HOST NATION SUPPORT, CONTINGENCY CONTRACTING***

Here in terms of the combat battalions, is the interesting story that our critics have not really focused on. Out of the actual flat end strength of the Active Army, we have been able to grow combat capability, and not with the use of mirrors. We have been able to do this through product enhancement technology.

Use of a cellular telephone on the battlefield has the promise of saving thousands of soldiers. New palletized loading systems such as an articulated-arm winch on the back of the truck could save two out of three soldier spaces. Those are the kinds of things that are enabling us to capture people and put them into combat capability.

In headquarters manning, the Army staff has been reduced for 2 years running and we are going to take another reduction. We have done that around the Army. We have taken those people and put them in battalions. That is where the Sixth Division is coming from and that is where the 10th Mountain Division came from.

JOINT FORCE DEVELOPMENT PROCESS

- ORIGINAL 31 JOINT INITIATIVES NOW 35—OVER 50% IMPLEMENTED
- ARMY, NAVY AND AIR FORCE PARTICIPATE
- DIRECT SUPPORT TO THE COMBATANT CINCS
- COMPLEMENT RATHER THAN DUPLICATE CAPABILITIES
- INCREASE TOTAL FORCE EFFECTIVENESS
- $1 BILLION COST AVOIDANCE

More deterrence for the dollar. The Joint Force Development program is an unprecedented initiative that General Gabriel and I started a couple years ago. There are 31 initiatives which have grown to over 35, and half have been implemented. Already a $1 billion cost avoidance has been realized.

AREAS OF SPECIAL CONCERN

- BRADLEY FIGHTING VEHICLE
- LIGHT HELICOPTER FAMILY
- AIR DEFENSE

The Bradley Fighting Vehicle has come into some unfortunate criticism recently in terms of vulnerability. We need improvements, such as putting a spall liner inside it, and putting some applique or reactive armor on the outside. The doctrine for the Bradley Fighting Vehicle proves that it is still a 24-carat vehicle and we need this vehicle.

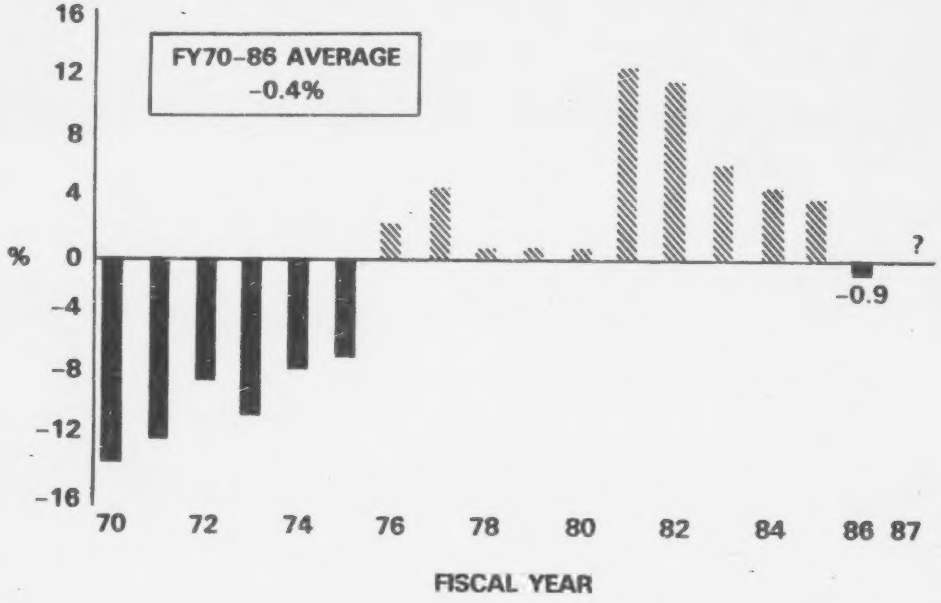
We need the light helicopter family, or LHX. Whatever we decide to do as a nation, we can buy either the LHX or a surrogate type vehicle such as the Black Hawk or Apache, but it is still going to be expensive. The reason we need to do this is, if we do not replace our helicopters by the mid-1990's, the helicopter fleet of the Army will be 30 years old.

So, something must be done, either use leap-ahead technology with the LHX or take existing helicopters and try to improve them.

AIR DEFENSE

With the DIVAD cancellation, it is a struggle to find an alternative capabilty there. We have now made a proposal to do that and we are looking at the capability to shoot over the hill with fiber optics and cable missiles as well as Improved Forward Area Air Defense capability.

ARMY REAL GROWTH TRENDS



The last area I address deals with resources of the Army over the years. As you see there was negative growth here in the early 1970's and good reason for that. We then began a small rate of growth in the late 1970's. In 1980 we experienced a substantial rate of growth, but it has since come down. With the effect of the Gramm-Rudman-Hollings reductions in 1986, we are back in the red.

The message I leave you is modernization for the Army began here, later than the other services. We are still only a third of the way through it. We are still trying to compensate for a decade of insufficient real rate of growth.

Senator RUDMAN. I do not understand that chart.

General WICKHAM. This is real rate of growth, that is negative, not positive. This means that we have no growth in these periods here. We were living off the shelf. In 1987 we had 2- to 3-percent real rate of growth in the budget over 1974 and 1975.

Senator RUDMAN. My question is, What does the last number assume?

General WICKHAM. This assumes the effect of the Gramm-Rudman-Hollings impact in 1986.

Senator RUDMAN. That assumes an automatic sequester?

General WICKHAM. Yes, sir; which is already in effect.

[The statement of General Wickham follows:]

PREPARED STATEMENT OF GEN. JOHN A. WICKHAM, JR.

CHIEF OF STAFF

UNITED STATES ARMY

Mr. Chairman, Members of the Senate Appropriations Committee. I welcome the opportunity to report on the state of today's Army and on our FY87 budget. While the Army Posture Statement provides a comprehensive discussion of our military capability, I want to focus on the importance of modernization and the essentiality of maintaining the momentum of Army programs.

As you know, our national strategy calls for deterring potential hostilities across the full spectrum of conflict. This involves protecting our global interests and safeguarding the United States, its Allies, and friends from aggression and coercion.

The world of today is now more dangerous than ever before. We see the growth of international terrorism, the spread of low intensity conflicts in the Third World, the relentless expansion of Soviet inflience in such countries as Afghanistan, Cuba, Nicaragua, Libya, South Yemen, Syria, and North Korea, and the Soviets' substantial investment in the modernization of their armed forces -- estimated to be from 15 to 17 percent of their FNP.

All of this means that peace and U.S. interests around the world continue to be threatened. This also means that the prescription for deterring hostilities across the spectrum of conflict calls for balance between U.S. strategic and conventional forces, maintaining readiness and modernization of these forces, assuring top quality personnel to man our forces, and keeping national vigilance.

The conflicts of this century, including the war against terrorism, reaffirm that wars are ultimately fought to control land, people, and resources. While all of our military services have the capability to influence these elements of national power, only ground forces can exert decisive and lasting control over them. In the nuclear era, landpower has become increasingly important to U.S. military strategy as a greater share of the burden of deterrence shifts to modern, conventional ground forces. The strength of our deterrence is established by forward stationed forces, integral to alliances, and by rapidly deployable forces that can move to troubled areas of the world so that they can influence events to our advantage.

This is why the Army must recruit and retain high quality soldiers in the small active Army as well as the Reserve Components; and why we must maintain balanced forces from Special Operations Forces and light divisions, for rapid deployment worldwide, to heavy forces which are essential for high intensity combat and NATO defense. It is also why the Army must continue modernizing its equipment to keep pace with the threat and with technological advances. Thanks to the American people and to the Congress, solid improvements have been made in recent years to the Army's military capability. In order to continue this kind of progress in FY 1987 we are requesting 80.6 billion dollars. This investment is necesssry if our small Army is to be an Army of Excellence: one that is ready, responsive, and responsible.

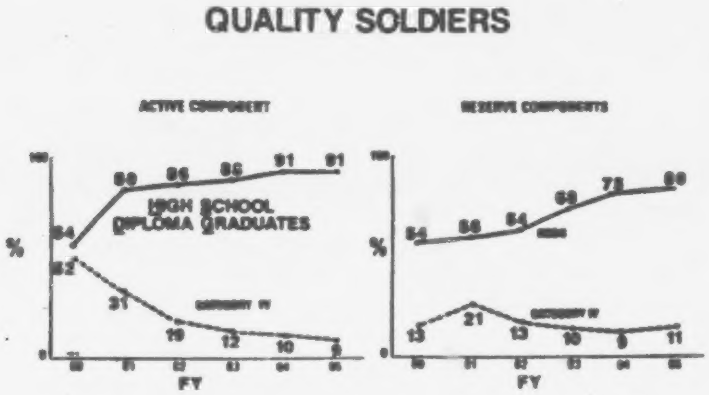
The Secretary of the Army and I share a common vision of how the Total Army -- Active and Reserve Components -- should prepare for land combat both today and tomorrow. The elements of this vision are:

- To provide quality soldiers and strong families in the Active and Reserve Components.
- To field a flexible, modernized force to fight across the conflict spectrum.
- To develop high technology and productivity enhancements.
- To exploit operational and tactical dimensions of AirLand Battle Doctrine -- the basics of fire and maneuver, Air Force and Army.
- To fight and sustain as part of joint and combined forces.
- To improve tactical and strategic deployability.

This vision keeps in view the developments of our potential adversaries as well as the promise of the high technology and industrial advantages enjoyed by the U.S. and its Allies. The doctrine and organizational concepts are in place to enable the Army to realize its vision. With your support and that of our citizenry, we will move forward, always ready and prepared to serve the interests of our great Nation.

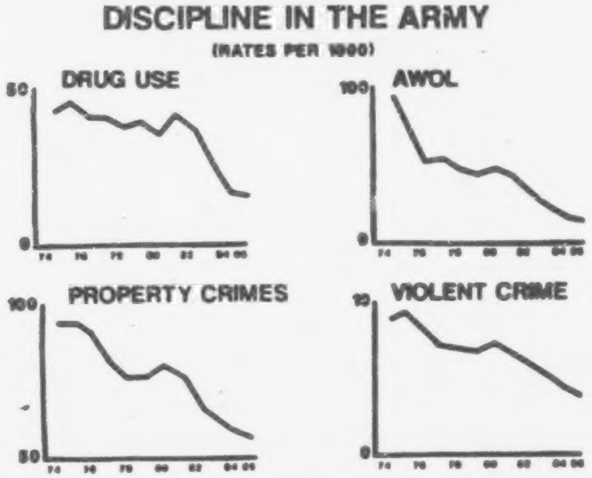
PEOPLE

A quality Army starts with quality soldiers supported by strong families, and I am happy to report that we have made great progress. As the chart below shows, Active Component accessions of high school diploma graduates (HSDG) have increased significantly since 1980, as have Reserve Component HSDG accessions. Category IV accessions remain at low levels; in fact, these are historical lows for the Active Component. These increases in quality reflect the support provided by this committee and the attention you have given to the recruiting and retaining of top-notch people in the Army.



[Chart 1]

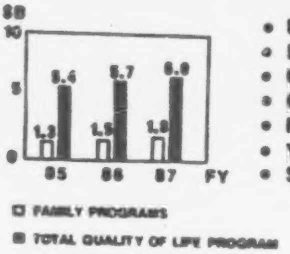
At the same time that quality has increased in the Active Army, rates of indiscipline have decreased. Drug offenses, AWOL, crimes against property, and violent crime are down significantly, as shown on this chart.



[Chart 2]

Moreover, with your support, we have made great strides towards providing a solid quality of life for our people and their families. The chart below shows that substantial resources have been programmed for, and invested in, quality of life and family programs. The FY87 resources will continue to improve living and working conditions and will meet a diverse set of needs, ranging from family housing to child development to maintenance and repair shops to soldier and family services.

QUALITY OF LIFE PROGRAMS



- HOUSING
- LIVING AND WORK PLACE
- CHILD DEVELOPMENT
- COMMUNITY SUPPORT
- REPAIR & MAINTENANCE
- YOUTH ACTIVITIES
- SOLDIER/ FAMILY SVCS

QUALITY SOLDIERS, STRONGER FAMILIES...

A MORE READY ARMY

[Chart 3]

This effort is worth every dollar that we invest. Recently, while visiting REFORGER units in Europe, I saw that our commitment to soldiers and their families has paid off significantly in terms of their increased commitment to a more ready Army. They see the very meaningful accomplishments that the Army has made to improve their quality of life, and their own resolve increases. Thus, the better soldiers and their families feel about the Army, the better is Army readiness.

Let me share with you a letter that makes this point. It is from a young paratrooper whom doctors saved from death after a parachute accident:

> Life's difficulties are always cropping up, but in the Army, people make up for the things that go wrong. There is always someone who will help in the Army. When the doctors thought I would never make it, my unit never gave up.
>
> They stayed behind me and behind my wife and my family the whole way. Words cannot express my thanks and the thanks of my wife for the care that my company commander, my first sergeant, and my Army buddies showed during the most difficult time in our lives.
>
> And that's what the Army is all about, taking care of each other. I appreciate what the Army is doing for families. And, you know what? I'm proud to be a soldier.

We need your continued support to attract and retain quality people. Our young people are "seed corn" for the future. We cannot afford to lose them. Also, we cannot afford to lose our more senior NCOs--the "backbone" of our Army--as we did several years ago, because that loss means a loss of leadership and experience that takes years to recover.

I remain convinced that diminished support for quality of life programs, including the important educational benefits for Active and Reserve Component soldiers, will jeopardize the volunteer force concept, increase turbulence, and lower combat readiness.

As a final point on people, let me request your assistance to fix a retirement funds issue from last year. The FY86 Department of Defense Authorization Bill directed the Department to submit legislation to achieve a 2.9 billion dollar savings by changing the military retirement system for new personnel entering the service, and those funds were cut from the services' budgets. The Department submitted two alternative retirement system proposals, but legislation has not been enacted. In the meantime, service members are entering the service under the present retirement system which requires a restoration of the funds.

We have received temporary relief by the Congress -- a transfer of 2.9 billion dollars from prior year balances, while Congress considers legislative changes to the retirement system. If Congress does not lift the cap on obligations, or change the retirement law, the services would have to reduce their forces by over 330,000 Active and 176,000 Reserve personnel. For the Army, that means a devastating reduction of 120,000 Active and 112,000 Reserve Component soldiers.

MODERNIZATION

Quality people deserve quality equipment particularly when we may be outnumbered by potential enemies. A key improvement to our military capability is modern equipment for Active and Reserve forces. Modernization means both enhanced readiness and sustainability. New equipment gives us a better capability on the battlefield and better operationally ready rates. This chart illustrates the types of equipment and modern munitions the Congress has authorized us to procure through FY86, and it also depicts an aggregate measure of how much the force will have improved by replacing older items with state-of-the-art equipment and munitions.

MODERNIZATION

(CONGRESSIONAL AUTHORIZATION THRU FY86)

EQUIPMENT

5,000 M1 TANKS
3,700 BRADLEYS
1,600 HELICOPTERS
95,000 TRUCKS
850 HOWITZERS
350 MLRS LAUNCHERS
39,000 NIGHT VISION DEVICES

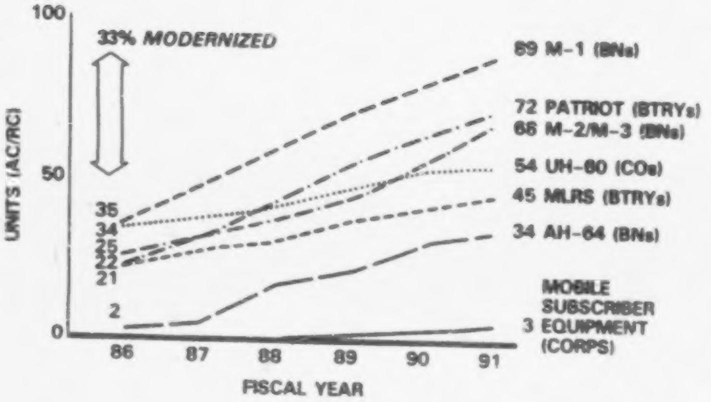
MODERN MUNITIONS

198,000 MLRS ROCKETS
15,000 STINGER
69,000 TOW II
23,000 COPPERHEAD
21,000 HELLFIRE

[Chart 4]

This equipment modernizes units and as the chart below shows, an extensive amount of unit modernization occurs over the next five years. We have made great progress, but we will have modernized only the Active "heavy division" force and their affiliated "round-out" units by the early 1990s. Much more remains to be done.

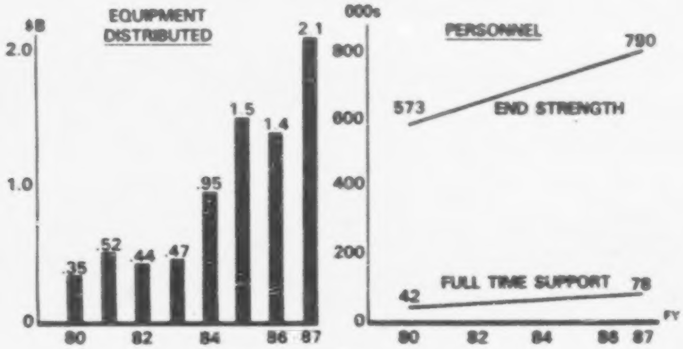
UNIT MODERNIZATION



[Chart 5]

Below, you see the significant growth in the amount of equipment distributed to the Reserve Components in the last several years. They are getting "product improved," older equipment from the Active Army as well as new equipment. The chart also shows how we have increased the personnel strength of the Reserve Components. New equipment and training for mobilization and deployment, require the support of full-time personnel. The chart shows the resultant growth in full-time support (AGRs and technicians).FOR THE ARNG AND USAR.

RESERVE COMPONENTS

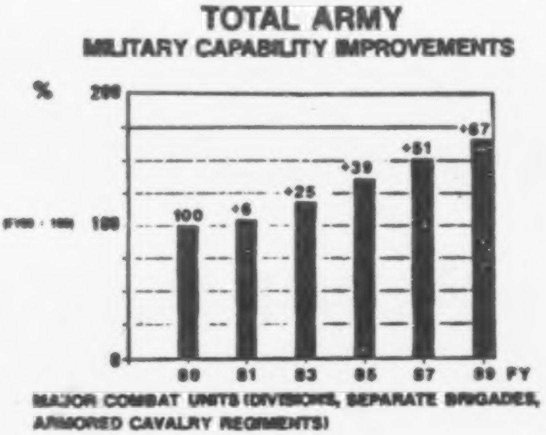


. . . FIRST TO FIGHT

FIRST TO BE EQUIPPED

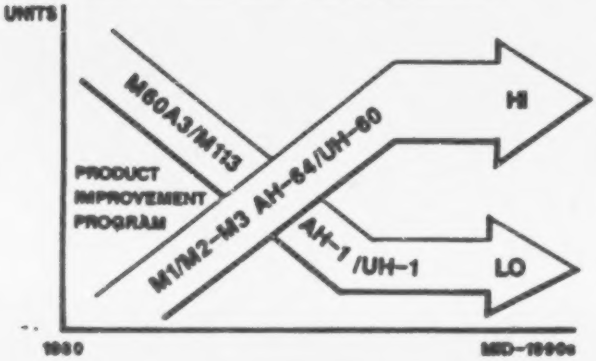
[Chart 6]

Another way of showing growth in capabilities for the Total Army is the "Measuring Improved Capabilities of Army Forces (MICAF)" study. MICAF quantifies capability improvements in Army divisions, separate brigades, and armored cavalry regiments in relation to the threat capabilities likely to be faced. In this sense, it is the most realistic evaluation of capabilities available to us. As the chart shows, since 1980, the capability of our major combat units in relation to the threat has increased almost 40 percent. Projected increases are shown for FY87 and 89.



[chart 7]

The Total Army's modernization strategy is based on the concept of a "high-low" mix in capability for its equipment, as shown below. The Army cannot afford to modernize across the board, all at once. Rather, it must continue infusing reasonable quantities of the most modern equipment, as the threat requires and technology permits, while "product improving" older equipment. On the high side, we are building forces around proven and reliable new equipment such as the Abrams tank, the Bradley Fighting Vehicle, the Apache attack helicopter, and the Black Hawk utility helicopter. On the low side, we are "product improving" older equipment, such as the M60 tank, the M-113, and the Cobra and Huey helicopters, to prolong their service lives and extend their capabilities. These weapons systems still have a place on the battlefield and also reduce equipment shortages and fill war reserve stocks. Such a cost-effective approach allows us to keep pace with the threat, technological advances, and sustainability requirements.



HIGH – LOW MIX
MODERNIZATION STRATEGY

- MEETS THE THREAT
- COST EFFECTIVE

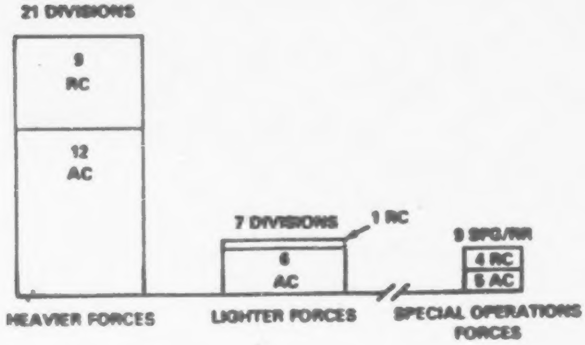
[Chart 8]

In this regard, research and development (R&D) is an investment that enables us not only to develop and capitalize on the "tiger of technology" but also to keep pace with a rapidly changing and sophisticated threat. We are driven by advances in technology, to a certain extent, and thus we can expect some continued turbulence in the weapons acquisition process. We must "product improve" our systems or risk defeat on future battlefields. The Army depends largely on superior equipment in the hands of well-trained and motivated soldiers to overcome a numerical disadvantage on the modern battlefield. R&D provides leverage for the future and is vital to the development of equipment that will allow us to capitalize on our AirLand Battle Doctrine.

As you can see, we are modernizing our force structure, giving it better balance, and increasing its combat power, all without an increase in the end strength of our Active Component. The following chart shows the major combat components of the Total Army. Our heavier forces remain oriented towards Central Europe and the NATO commitment. Our lighter forces increase our strategic flexibility and deployability; and, thus, they enhance our ability to deter war. Deployability is deterrence. These light forces, along with our improved Special Operations Forces, give the National Command Authorities the options needed to handle the challenges of low intensity conflict, the most likely we expect to face in the future. Army light and Special Operations Forces will also play an important role in a high intensity war.

For example, by holding heavily forested or urban areas, our rapidly deployable light infantry divisions can free up our tank and mechanized forces for offensive operations.

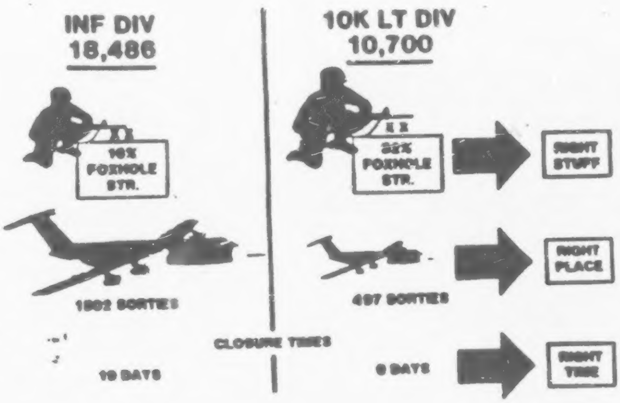
COMPOSITION OF THE TOTAL ARMY



[Chart 9]

You can see that the Reserve Components continue to play an important role in our force structure (10 of 28 divisions; they constitute 49 percent of our total strength, 50 percent of our combat battalions, 70 percent of our deploying forces, and 69 percent of our combat service support). They have substantially more equipment and simulators, take part in exercises with active forces overseas and in the U.S., train at the National Training Center, and have sustained steady growth in full-time manning. The Reserve Components have come a long way in improved readiness and capabilities.

Twenty-five percent of our total Army divisions are configured as lighter forces, including the newly organized light divisions. This chart shows the advantages of the light infantry division. Getting to the "right place, at the right time, with the right stuff," is a capability that enhances the deterrent power of the United States and adds to its strategic, non-nuclear capabilities.

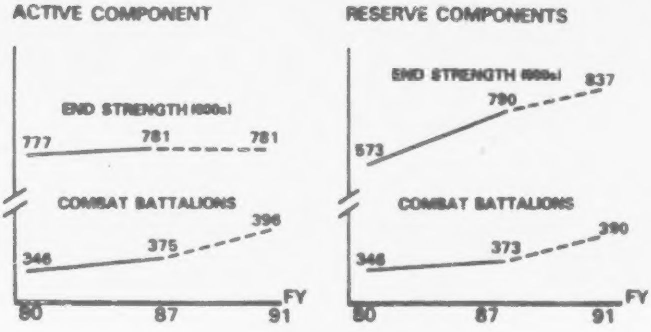

INF DIV
18,486
XX
16%
FOXHOLE
STR.
1802 SORTIES
19 DAYS
10K LT DIV
10,700
XX
32%
FOXHOLE
STR.
RIGHT STUFF
497 SORTIES
RIGHT PLACE
CLOSURE TIMES
6 DAYS
RIGHT TIME

[CHART 10]

We remain vitally concerned about the adequacy of airlift and sealift resources, and we continue to support fully the Air Force and Navy in their efforts to improve our strategic mobility.

Within the overall composition of the Total Army, we have increased our combat capability as this chart shows. For the Active Army, we have created 29 additional battalions through FY87, with 21 more programmed between now and FY91. This increase has been accomplished essentially within the confines of a constant end strength for the Active Component. Also shown here is the increase in RC end strength and the growth in combat power in the Reserve Component..

GROWTH OF COMBAT CAPABILITY



INITIATIVES

- *PRODUCTIVITY ENHANCING TECHNOLOGY*
- *ORGANIZATIONAL MODERNIZATION*
- *HEADQUARTERS REDUCTIONS*
- *RESERVE COMPONENT GROWTH*
- *CIVILIAN SUBSTITUTION, CONTRACTING*
- *HOST NATION SUPPORT, CONTINGENCY CONTRACTING*

[Chart 11]

We have chosen to keep the end strength constant for Active Component forces, in order to protect our readiness, sustainability, essential modernization, and people programs. We have disciplined our appetite for active end strength increases so that we can maintain the overall quality of our forces and capitalize on productivity enhancing technology. But we are increasing our Reserve and National Guard strengths to permit more qualified citizens to serve their country and to improve our deterrent posture. This fundamental choice has been a key part of our strategy for building and equipping today's Army.

The substantial increase in our deterrent and combat capability shown on the last chart was accomplished through several initiatives: productivity enhancing technology, organizational modernization, headquarters reductions, Reserve Components' growth, civilian substitution and contracting, and Host Nation Support and contingency contracting. Technology is especially important to our efforts to conserve manpower and convert it to combat power. This chart provides a good example of how technology will help us to improve our support bridging capability in the early 1990s. With acquisition costs equal to the older model, the new bridge saves manpower, transportation, weight, and time. The crew will be reduced by 75 percent, the vehicles by 60 percent, and erection time by 75 percent.

PRODUCTIVITY ENHANCING TECHNOLOGY

HEAVY DRY SUPPORT BRIDGE

CHARACTERISTIC	TODAY	TOMORROW
SPAN CAPABILITY	153 FT	100 FT
CREW SIZE	33	6 8 (TRUCK CREW)
TRANSPORTATION REQUIRED	7 TRUCKS 7 TRAILERS	3 TRUCKS
WEIGHT	40 TONS	22 TONS
BUILD TIME	3 HRS	45 MIN
ACQUISITION COST	EQUAL	EQUAL

[Chart 12]

In the areas of training and sustaining, the chart below shows some of the improvements made to enhance our readiness. National Training Center (NTC) rotations, range modernization, and Reserve Components overseas deployment training provide superb training experiences for our soldiers and units. The improved status of POMCUS (Prepositioning of Materiel Configured to Unit Sets), Host Nation Support, and War Reserve Stock will enhance our reinforcement capability and will help sustain our forces once they are committed to combat. This latter area, although less glamorous, has not been neglected in the course of building a renewed posture of readiness for the Army.

TRAINING AND SUSTAINING

(FY 81 - FY 86)

- NATIONAL TRAINING CENTER
  - FY86 - 28 BATTALION ROTATIONS (26 ACTIVE, 2 RESERVE)
- RANGE MODERNIZATION
  - 46 MAJOR RANGES CONSTRUCTED OR MODERNIZED
  - COMBINED ARMS DESIGN
- RESERVE COMPONENT OVERSEAS DEPLOYMENT TRAINING
  - 84% INCREASE
- POMCUS
  - DOUBLED
- HOST NATION SUPPORT
  - 33 UNITS ACTIVATED (FY 81-86)
  - 59 UNITS SCHEDULED FOR ACTIVATION FY 86
- WAR RESERVES (DOS)
  - 23% INCREASE IN MUNITIONS
  - 27% INCREASE IN MAJOR ITEM PROCUREMENT (E.G. TANK)
  - 113% INCREASE IN SECONDARY ITEMS (E.G. ENGINES)

[Chart 13]

JOINTNESS

"Jointness" is vital to success in combat. If we had to go to war tomorrow, we would go jointly. I can tell you that the Army, by virtue of its business, has to be the most joint of the services. General Gabriel, the Air Force Chief of Staff, and I instituted the Joint Force Development Process in May 1984 by Memorandum of Agreement. The objective remains to develop complementary rather than duplicative capabilities, to fill voids in our warfighting capabilities, and to increase total force effectiveness in direct support of the warfighting commanders in chief. We have broadened participation in the process to include the other services.

JOINT FORCE DEVELOPMENT PROCESS

- ORIGINAL 31 JOINT INITIATIVES NOW 35-OVER 50% IMPLEMENTED
- ARMY, NAVY AND AIR FORCE PARTICIPATE
- DIRECT SUPPORT TO THE COMBATANT CINCS
- COMPLEMENT RATHER THAN DUPLICATE CAPABILITIES
- INCREASE TOTAL FORCE EFFECTIVENESS
- $1 BILLION COST AVOIDANCE

[Chart 14]

We have implemented over half of the original thirty-one Air Force-Army initiatives and have added four new ones. The initiatives have resulted in roughly a billion dollars of near-term cost avoidance as we have reduced or eliminated duplicative programs. Furthermore, they are helping the Army and the Air Force to develop doctrinal and procedural agreements that lead to better operations on the battlefield. Similar agreements with the Navy are helping to improve our strategic sealift and logistics-over-the-shore capabilities.

This chart shows several systems, comprising the Joint Interdiction Program, that are particularly important to our joint efforts: Joint Surveillance and Target Attack Radar System, Joint Tactical Fusion Program, and the Joint Tactical Cruise Missile System. These three joint programs are critical to the future success of our AirLand Battle Doctrine and are essential to NATO's FOFA strategy.

JOINT INTERDICTION PROGRAM

			RDTE — $M	
			FY85	FY86
FIND THEM ————	JSTARS	ARMY	50	44
		AF	90	152
ANALYZE THEM ——	JOINT TAC FUSION	ARMY	73	187
		AF	11	27
KILL THEM ————	JTACMS	ARMY	CLASSIFIED	
		AF	PROGRAM	

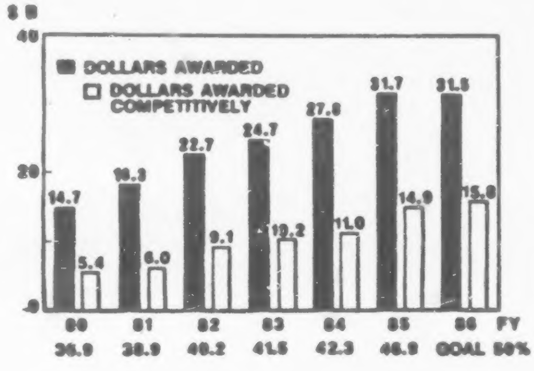
MAKES AIRLAND BATTLE WORK

[Chart 15]

STEWARDSHIP

As we have improved our military capability in terms of people, equipment, force structure, training, and support, we have been better stewards of the resources entrusted to us. For example, the chart below shows how we have increased competition in the procurement process. In FY85, we exceeded our goal of 46 percent of dollars awarded competitively, and this year, FY86, we are aiming for 50 percent.

COMPETITION PERFORMANCE



[Chart 16]

Another example involves multiyear procurements and reduced costs (actual or estimated) from FY82 to FY87. These efficiencies are driven by competition and are substantial as shown below.

MULTI-YEAR PROCUREMENT

	REDUCED COSTS ($M)
FY 82 BLACKHAWK AIRFRAME, M1 FIRE CONTROL, AN/ALQ-136 RADAR JAMMER	273
FY 83 T700 ENGINE, MLRS, M60 TANK THERMAL SIGHT, BFVs COMPONENTS, PLRS, HMMWV	594
FY 85 SHOP EQUIPMENT CONTACT MAINTENANCE, BLACKHAWK AIRFRAME, BFV TURRET DR, 5 T TRK, CH-47D MOD.	401
FY 86 T700 ENGINE (ARMY ONLY), M1 TANK ENGINE, M1 TANK CHASSIS, M1 FIRE CONTROL, BUSHMASTER 25MM GUN, BFV TRANSM., AH-64 APACHE PENDING	1,067
FY 87 PATRIOT, STINGER	477
	2,812

[Chart 17]

Simulators also lead to efficiencies as well as substantially improved training. This chart shows the reduced costs we realize from our aircraft and tank training simulators.

SIMULATOR EFFICIENCY

AIRCRAFT	COST OF SIMULATOR	REDUCED COSTS PER YEAR	PAYBACK PERIOD
UH-1	$ 2.5M	$6.1M	.4 YRS
UH-60	$10.6M	$5.2M	2.0 YRS
AH-64	$22.5M	$8.1M	2.8 YRS
AH-1	$15.1M	$2.9M	5.2 YRS

TANK	COST OF SIMULATOR	REDUCED COSTS PER YEAR (AMMUNITION)	PAYBACK PERIOD
105 MM (M60 SERIES & M1)	$2.2M	$.3M	7.3 YRS
120 MM (M1A1)	$2.2M	$1.8M	1.2 YRS

[Chart 18]

AREAS OF SPECIAL CONCERN

Now, I want to highlight some areas that are of special importance to the Army and its ability to execute the missions entrusted to it.

AREAS OF SPECIAL CONCERN

- BRADLEY FIGHTING VEHICLE
- LIGHT HELICOPTER FAMILY
- AIR DEFENSE
- SPECIAL OPERATIONS FORCES
- CHEMICAL WEAPONS

[Chart 19]

First, the Bradley Fighting Vehicle (BFV) remains an indispensable part of our combined arms team and is essential to our modernization programs. The BFV's ability and firepower provide the required complement to the Abrams tank for AirLand Battle operations on the high intensity battlefield. Incidentally, all major armies of the world have infantry fighting vehicles designed to protect infantry from artillery fragments and small caliber weapons, and have mounted on them antitank weapons as well as cannons for suppressive firepower.

The results of our vulnerability tests show that the BFV is a tough, survivable vehicle far superior to its predecessor, the M-113, and to the Soviet BMP. As threats to its survivability increase, or as technology changes, we will "product improve" the vehicle, as we do with all our soldiers' equipment, if the improvements are cost effective. The product improvements we now plan for the BFV include a spall liner to reduce fragment damage and applique or active armor to defeat shaped charge attack. We estimate the cost at less than $75k per vehicle.

As our soldiers have demonstrated at the National Training Center, which is the best and most demanding combined arms training center in the world, the Bradley Fighting Vehicle has significantly increased the combat power of battalion task forces, giving them superior flexibility, security, and the added killing capability to deal with masses of enemy armored vehicles. For example, in one battle in the desert at Fort Irwin, a BFV unit detected and destroyed an enemy security zone force without slowing down. Several weeks earlier, an M-113 equipped unit spent several hours battling the enemy on a similar mission in the same location. Our soldiers want the Bradley Fighting Vehicle. The Army needs this vehicle if it is to achieve the full potential of the heavy forces combined arms team centered on the M1 Abrams tank, and if we are to avoid being outclassed on the high intensity battlefield. I urge you to give it your full support and continued funding.

Second, the Army's light helicopter fleet (OH-58, AH-1, and UH-1) in the 1990s will be almost 30 years old and will be vulnerable to the Soviet threat. Some product improvements have been made to the fleet to extend service life and improve capabilities, but unless we begin fielding a replacement fleet with "leap ahead" technology we shall be outclassed on the battlefield. That's why we need the LHX program. The objective is to develop, qualify, and competitively procure an affordable, supportable, and highly survivable advanced technology helicopter system that meets the operational requirements of the Army in the mid-1990s and beyond. The LHX will give us a lightweight, highly reliable, and easily maintained family of advanced helicopters.

Third, as you know, one of our major shortcomings is the lack of effective air defense in the forward battle area. The termination of the DIVAD program aggravated this problem, creating a void in our forward area air defenses. To protect our forward maneuver forces, we have developed a "forward area counter air concept" which provides a joint and combined arms solution to a rapidly growing air threat. On future battlefields, we will face in the forward area increasingly sophisticated and difficult to kill attack helicopters, fixed-wing aircraft, and drone. Our concept requires a mix of capabilities. These include a combination of new weapons, a fiber optics guided missile capable of killing helicopters behind hills, gun-missile systems, command and control improvements, and enhancements to existing weapons, including the tank, BFV, and artillery. Your support is needed to get the forward area air defense program underway, otherwise the substantial investment we have made in the M1, BFV, and other modern capabilities will be at risk.

Fourth, the Army is firmly committed to the revitalization of its Special Operations Forces (SOF). Readiness of our Active Component SOF has improved, and Reserve Component readiness is a priority action. The Army SOF modernization action program provides the basis for our effort with 74 issues that range from increased force structure through modernized communications capability, and improved sustainability. With respect to command and control of Army SOF, we are developing a concept which would improve the coordination of all elements of the force in support of the war fighting commanders in chief. Additionally, the Army has initiated action among the Joint Chiefs of Staff to improve the overall military organization of our SOF.

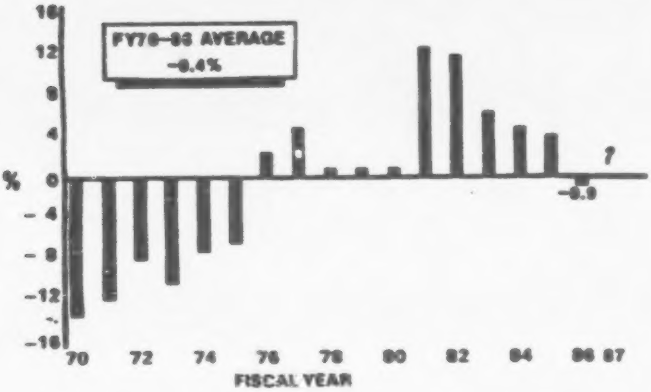
Fifth, we must continue to modernize our chemical weapons so that we can regain a credible deterrence capability and progress in efforts to ban chemical weapons altogether. Your demonstrated resolve in initiating this modernization effort last year has provided the impetus for what now appears to be a more serious interest on the part of the Soviets for pursuing treaty discussions. We must keep the pressure on. To that end, the Army has requested FY87 funds to continue to build binary production base facilities and produce binary munitions.

I have discussed the state of the Total Army and highlighted areas that need special emphasis. Let me conclude by expressing my greatest concern: That we will fail to carry through with the Army's modernization programs.

This, we cannot do. We have come too far in the revitalization of our defense program over the last five years to abandon the gains made to date.

We have made much progress, but we are far from finished. Never before has so much been expected of our Army. The threats posed by the spectrum of conflict we face, ranging from terrorism to high-intensity conflict, are both diverse and difficult. We must apply sufficient resources to meet our security requirements. On this chart, you see the real growth trends for the Army since 1970. It does not show the potential impact of congressional action or the Gramm-Rudman-Hollings legislation on the 1987 budget, which compounds the problem.

ARMY REAL GROWTH TRENDS



[Chart 20]

Three significant factors emerge: one, we see a sinusoidal "rate of growth" curve rather than the steady-state growth condition. A steady-state condition obviously eases planning and execution, as we try to build Army forces, and allows more cost effective acquisition policies. Two, we have averaged "negative" real growth over this entire period, and, in fact, we "lived off the shelf" for most of the 1970s. Third, in recent years, we see again a negative trend in resources for the Army, with the effect of undercutting modernization, readiness, and sustaining capabilities. Quality of life for our soldiers and their families also will suffer.

This downward trend comes at a time when we are only midway in our modernization programs, contrary to the experience of the other services that started three to four years ahead of us. As of FY86, we will have been authorized to procure only two-thirds of the M-1s, Apaches, Black Hawks, Multiple Launch Rocket Systems, and Patriots that we need, and only one-half of the BFVs that we need. In fact, only one-third of our units are modernized with this new equipment.

We need the support of Congress and the American people to maintain the momentum of the progress made to date. The lessons of history tell us that strong, modern, conventional forces enhance deterrence and raise the nuclear threshold. With your continued support, today's Army will be ready, responsive, and responsible ... Now and in the future.

AN ARMY OF EXCELLENCE:

READY, RESPONSIVE AND RESPONSIBLE

JOINT STATEMENT
BY
THE HONORABLE JOHN O. MARSH, JR.
SECRETARY OF THE ARMY
AND
GENERAL JOHN A. WICKHAM, JR.
CHIEF OF STAFF, UNITED STATES ARMY
BEFORE
COMMITTEES AND SUBCOMMITTEES
OF THE
UNITED STATES SENATE
AND THE
HOUSE OF REPRESENTATIVES
SECOND SESSION, 99TH CONGRESS

THE POSTURE OF THE UNITED STATES ARMY
FOR FISCAL YEAR 1987

U.S. ARMY MISSIONS:

- DETER AND, IF NECESSARY, DEFEAT A WARSAW PACT ATTACK ON NATO AND MAINTAIN ITS TERRITORIAL INTEGRITY AND SECURITY
- DENY SOVIET CONTROL OF THE PERSIAN GULF AND ASSOCIATED OIL RESOURCES
- DEFEND VITAL U.S. INTERESTS IN THE PACIFIC
- SUPPORT ALLIES IN ASIA, LATIN AMERICA AND AFRICA
- MAINTAIN A STRATEGIC RESERVE CAPABLE OF COUNTERING THREATS IN THE WESTERN HEMISPHERE;
- RESPOND TO OTHER THREATS TO U.S. INTERESTS ANYWHERE IN THE WORLD

PREFACE

The national military strategy of the United States requires an Army that can respond effectively to the full spectrum of threats faced by us and our allies. The Army ensures the attainment of our national security objectives by providing our Nation with a quality, modern, and ready military force. With the support of the American people through their elected representatives in Congress, we have made great progress in recent years. However, our work remains unfinished. The Army is only midstream in a modernization program that was long overdue. This effort is designed to make today's Army a responsive and relevant force well into the 21st century.

Continued support of the Congress is essential if we are to maintain the momentum of our progress. We must carefully balance our efforts to achieve federal deficit reductions with our requirements for national security. Peace with freedom is our ultimate aim.

This posture statement discusses the state of the Total Army, the challenges we must overcome, and the resources needed to perform the necessary tasks. We in the Army must provide sound, responsible leadership in the stewardship of resources entrusted to us. Though the costs are high to provide our Nation with that required quality force, the Army believes that the potential price of not maintaining the force is far greater.

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

JOHN O. MARSH, JR.
Secretary of the Army

JOHN O. MARSH, Jr.
SECRETARY OF THE ARMY

Mr. Marsh was sworn in as Secretary of the Army on January 30, 1981.

A native of Virginia, he was born in Winchester on August 7, 1926. After attending public schools in Harrisonburg, Virginia, he enlisted in the United States Army and was commissioned at the age of 19 upon graduation from OCS in 1945. He served with the United States occupation forces in Germany. Mr. Marsh is also a graduate of Parachute School and Jumpmaster School at Fort Benning and holds Senior Parachutist Wings.

In 1951, Mr. Marsh received his LL.B degree from Washington and Lee University, Lexington, Virginia. He was then admitted to the Virginia Bar and began law practice in Strasburg, Virginia.

A four-term Congressman from Virginia's 7th District, he served in the United States House of Representatives from 1963 to 1971 and was a member of the House Appropriations Committee.

In 1966, while a member of Congress, he volunteered and served a month's active duty with the U.S. Army in South Vietnam. Choosing not to seek a 5th term, he resumed the practice of law. He returned to Federal service in March 1973 as the Assistant Secretary of Defense for Legislative Affairs.

In January 1974, he became Vice President Ford's Assistant for National Security Affairs, then Counsellor, with Cabinet Rank, to President Ford. He held that position from August 1974 to January 1977.

After serving President Ford, he again returned to private law practice as a partner in the Washington, DC office of the law firm of Mays, Valentine, Davenport and Moore of Richmond, Virginia.

He served in the 116th Infantry Regiment, the 29th Infantry Division and the State Headquarters Detachment to the Virginia National Guard from 1951 to 1976, retiring with the rank of Lieutenant Colonel. Prior to his National Guard service, he was a member of the Army Reserve for four years. He also served for five years on the Board of Visitors to the Virginia Military Institute.

He has been awarded the Department of Defense Distinguished Public Service Medal, the American Legion Distinguished Service Medal, and the National Guard Distinguished Service Medal.

He is married to Glenn Ann Patterson. They have three children: Rob, Rebecca and Scot. Rob is a Captain in the United States Army Medical Corps stationed at Fort Eustis, Virginia. Rebecca is a high school teacher in Williamsburg, Virginia. Scot is a graduate of the Virginia Military Institute and a First Lieutenant in the Virginia National Guard.

GENERAL JOHN A. WICKHAM, JR.
CHIEF OF STAFF
UNITED STATES ARMY

General Wickham was born in Dobbs Ferry, New York, on 25 June 1928. He was commissioned a second lieutenant and awarded a Bachelor of Science degree from the United States Military Academy. He also holds a Master of Public Administration degree and a Master of Arts degree in Political Economy and Government from Harvard University. His military schooling includes the Infantry School, United States Army Command and General Staff College, Armed Forces Staff College, and the National War College.

He has held a wide variety of command and staff assignments, including 12 years in joint and allied headquarters. General Wickham has had three tours of duty with the Joint Staff, the last as Director. He served two Secretaries of Defense as Senior Military Assistant. His extensive overseas service includes six tours, two each in Germany, Korea, and Vietnam. During his last tour in Vietnam he served as deputy negotiator on peace treaty issues with North Vietnamese and Viet Cong military leaders.

He commanded an Infantry Battalion with the 1st Cavalry Division in Vietnam. In Germany he was a Brigade Commander and Division Chief of Staff with the 3d Infantry Division. He commanded the 101st Airborne Division (Air Assault) and deployed the division with most of its equipment to Europe for allied maneuvers in REFORGER 1976. During his last tour in the Republic of Korea, he was Commander of the Eighth United States Army and United States Forces, Korea; Commander in Chief of the United Nations Command with responsibility for enforcing the Armistice; and Commander in Chief of the ROK-US Combined Forces Command consisting of over 1/2 million military personnel. General Wickham left Korea and assumed the duties of Vice Chief of Staff, Army effective 17 June 1982. General Wickham became the 30th Chief of Staff of the Army on 22 June 1983.

His awards include the Defense Distinguished Service Medal (with 2 Oak Leaf Clusters), Army Distinguished Service Medal, Silver Star (with Oak Leaf Cluster), Legion of Merit (with 3 Oak Leaf Clusters), Bronze Star Medal with V Device, Meritorious Service Medal, Air Medal (11), Army Commendation Medal, Purple Heart, Combat Infantryman Badge, Expert Infantryman Badge, Parachutist Badge, Air Assault Badge, Secretary of Defense Identification Badge, and the Army General Staff Identification Badge. His foreign awards include the Republic of Korea Taegueg Medal, the highest Korean military decoration.

General Wickham is married to the former Ann Lindsley Prior. They have three children: Lindsley, John A., III, and Matthew.

AN ARMY OF EXCELLENCE: READY, RESPONSIVE, AND RESPONSIBLE

The four very different wars that we have fought in this century have reaffirmed that wars are ultimately fought to control land, its people, and its resources. While all of the services have the capability to influence these elements of national being, only ground forces can exert decisive control over them. Furthermore, as essential equivalence in the nuclear realm shifts the burden of deterrence to conventional forces, landpower assumes increased importance as an element of U.S. national military strategy.

The lessons of twentieth century wars are doubly relevant for a future where we will be locked in permanent, multifaceted competition with the Soviet Union. The Soviet Union, with its captive allies and its proxies, is—in Churchill's phrase—"a land animal." Its ground forces are the dominant branch of service and all other services are designed, in varying degrees, to support the offensive operations of the ground forces. The Soviet Union, with its unique geostrategic position, can project powerful forces west into the NATO area, south toward the Persian Gulf, or east toward Northeast Asia, all areas critical to the well being of this nation and our allies. The Soviets can capitalize on a unique geographic location that enables them, if necessary, to undertake any or all of these operations without having to cross significant water barriers. Clearly, to deter or defeat a threat with these capabilities, the United States must rely heavily on its landpower.

THE THREAT: EXPANDING CHALLENGES ACROSS THE SPECTRUM OF CONFLICT

The primary threat to U.S. security today is posed by the Soviet Union. Soviet forces continue to expand, modernize and deploy increasingly capable weapons systems designed for the entire spectrum of strategic, theater-nuclear, and conventional conflict. Additionally, non-Soviet Warsaw Pact countries are expanding and upgrading their own forces to support Soviet military objectives. Although war with the Soviet Union and its Warsaw Pact allies could threaten the very survival of the United States, the likelihood of such a conflict today is low. The conflicts most likely to threaten our national security interests are those at the lower end of the spectrum of violence—terrorism and other low-to mid-intensity conflict. Increasingly, regional powers hostile to the United States are building destabilizing, modern military forces which threaten regional power balances and U.S. security interests. Given these complexities, the Army must be prepared to

SOVIET GROUND FORCES

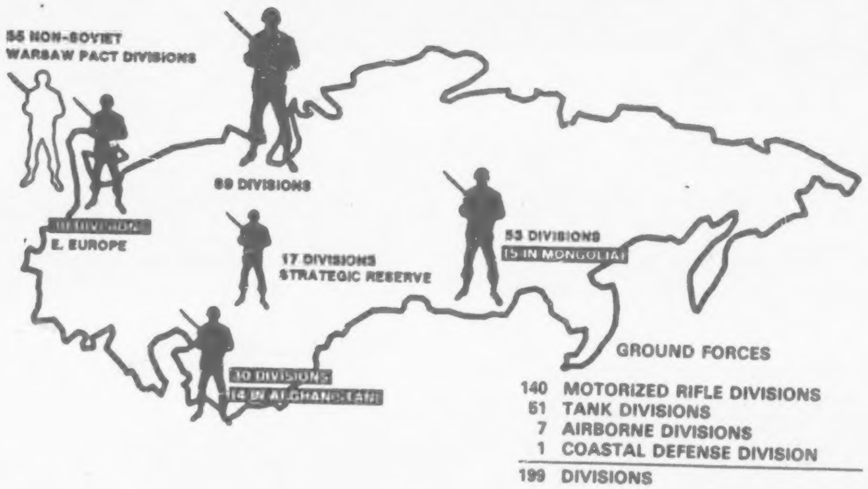

55 NON-SOVIET
WARSAW PACT DIVISIONS
69 DIVISIONS
E. EUROPE
17 DIVISIONS
STRATEGIC RESERVE
53 DIVISIONS
(5 IN MONGOLIA)
30 DIVISIONS
(4 IN AFGHANISTAN)
GROUND FORCES
140 MOTORIZED RIFLE DIVISIONS
51 TANK DIVISIONS
7 AIRBORNE DIVISIONS
1 COASTAL DEFENSE DIVISION
199 DIVISIONS

Figure 1.1

respond to the outbreak of nonnuclear or nuclear war with the Soviet Union and at the same time be prepared to meet diverse challenges along the remainder of the spectrum.

Soviet Forces. From a Soviet perspective, successful war in Central Europe demands the defeat of NATO as a military and political alliance. To accomplish this, the Soviet Union prepares to conduct a strategic operation in its western theater (Central Europe) under either nuclear or nonnuclear conditions. Even though the Soviets plan for nuclear war, they expect that the application of nonnuclear firepower and high-speed maneuver would quickly overwhelm NATO's forward defenses. High priority is placed on destroying NATO's theater nuclear assets at the outset so that NATO would not have the capability, through its remaining theater nuclear weapons, to alter decisively the outcome of the conflict. Authoritative Soviet military spokesmen emphasize that multiple front operations must be conducted with little or no pause. They advocate theater-level combined arms warfare conducted with a tempo that quickly and relentlessly overwhelms NATO. They envision simultaneous engagement of NATO forces from the front line to the depth of the theater in a single operation to achieve strategic victory.

In contrast, the Soviet General Staff of World War II thought in terms of phased operations requiring great effort, long pauses for preparation and renewed effort resulting in one campaign after another. The current concept stands in vivid contrast to that form of warfare. It reflects a comprehensive appreciation of military requirements in an era of increasingly critical technological considerations and changing perceptions of future battlefield needs. Soviet planners are becoming acutely aware that the potential of new technologies will increasingly shape future strategy and force structure.

Recent and ongoing force developments that enhance Soviet capabilities to conduct a successful theater operation in Central Europe include:

- Reorganization of air and air defense forces;
- Modernization of weapon systems;
- Refinement of the Operational Maneuver Group concept;
- Increased helicopter support;
- Increased artillery fire support at all levels;
- Comprehensive chemical warfare capability;
- Nuclear capable artillery;
- Improved short-range ballistic missiles;
- Continued growth of logistical capabilities;
- Improved command, control, and communications.

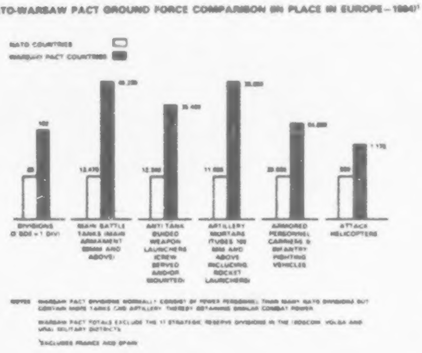


Figure 1.2

Regional Developments and Global Reality. Turning to geographic areas outside Europe, several trends have combined to create a global environment with unprecedented challenges to U.S. influence and global stability.

The first trend—already addressed—has been the Soviet military build-up which has relevance not only in Europe but in other contiguous regions such as South, Southwest, and Northeast Asia. Other trends of significance to U.S. national security interests are:

- Steadily improving Soviet power projection capability and continued activism in the Third World;
- The growing militarization of the Third World, characterized by fragile governments locked in regional rivalries and internal conflicts intensified by the growing quantities, lethality, and sophistication of weapons, to include chemical and biological weapons;
- The rise of terrorism world-wide.

A more detailed examination of these developments reveals a strategic environment which is measurably different and more dangerous than that the United States confronted as little as a decade ago.

PRODUCTION OF GROUND FORCES MATERIEL USSR/NSWP AND NATO*

EQUIPMENT TYPE	1984 USSR	NSWP	1984 NATO
TANKS	3,200	450	1,760
OTHER ARMORED FIGHTING VEHICLES	3,800	1,200	2,230
TOWED FIELD ARTILLERY	1,600	250	425
SELF-PROPELLED FIELD ARTILLERY	1,000	300	240
MULTIPLE ROCKET LAUNCHERS	600	100	80
SELF-PROPELLED AA ARTILLERY	50	0	40
TOWED AA ARTILLERY	–	225	50

*REVISED TO REFLECT CURRENT TOTAL PRODUCTION INFORMATION. INCLUDES UNITED STATES: EXCLUDES FRANCE AND SPAIN. NSWP IS NON SOVIET WARSAW PACT.

Figure 1.3

Improving Power Projection Capabilities. A major manifestation of the Soviet Union's global ambitions has been its steadily expanding presence and reach beyond Soviet borders. Increasingly, Soviet capability to project power is characterized by world-wide

SOVIET GLOBAL POWER PROJECTION

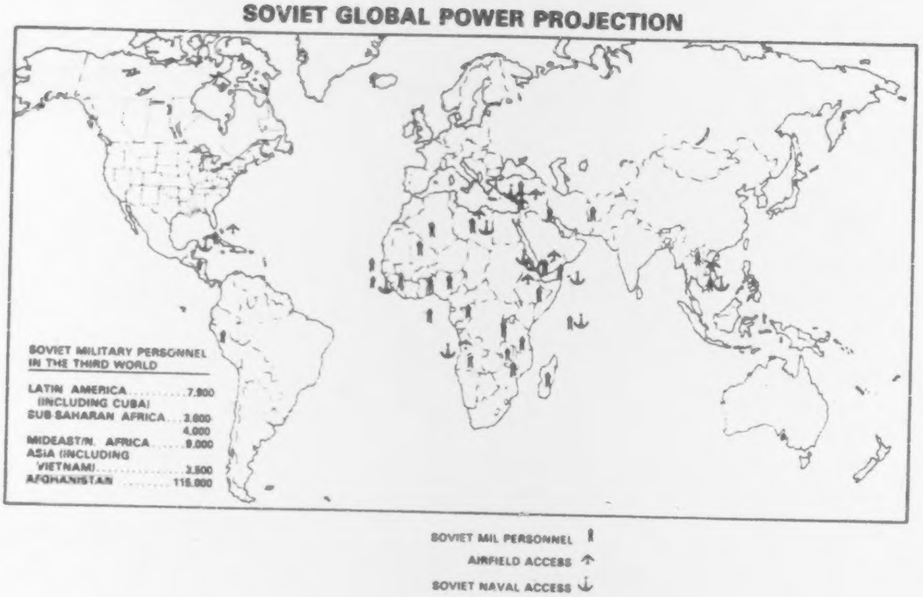

SOVIET MILITARY PERSONNEL IN THE THIRD WORLD
LATIN AMERICA (INCLUDING CUBA) 7,900
SUB-SAHARAN AFRICA 3,000 4,000
MIDEAST/N. AFRICA 9,000
ASIA (INCLUDING VIETNAM) 3,500
AFGHANISTAN 115,000
SOVIET MIL PERSONNEL
AIRFIELD ACCESS
SOVIET NAVAL ACCESS

Figure 1.4

naval and air deployments; increasing numbers of military technicians and security advisors in the Third World; a growing global network of communications and intelligence collection sites; and the willingness of client states, most notably Cuba, to act on the Soviets' behalf in regional conflicts.

Growing Militarization of the Third World. A related phenomenon—one which reinforces regional instability—is the ongoing militarization of Third World nations. In virtually every region of the world, instability, underdevelopment, fragile governments, and regional rivalries persist. The world map is dotted with conflicts and simmering tensions. While these instabilities are not necessarily created by the Soviets, events have shown they often exploit internal tensions. The presence and activism of the Soviet Union and its surrogates provide opportunities to decrease U.S. influence and to diminish the prospects for the viability of democratic values.

Nowhere is the ongoing militarization more obvious than in the Middle East. The cost of these regional arms races has practically eliminated investment for economic and social development in some countries, thus perpetuating the underlying causes of instability. Even if these states cannot fully exploit the capabilities of the weapons they own, the potential consequences of militarization—the quicker resort to more lethal tools of violence—presents a sobering picture and an ominous trend for a United States committed to the defense of friends and allies in troubled regions.

Soviet and Cuban adventurism in Central America and the Caribbean basin has elevated the military importance of this sub-region. Today, Cuba's military is the second largest in Latin America, second only to Brazil. Rapid military buildup in Nicaragua, along the same pattern as Cuba, has already created significant military imbalance in Central America, an imbalance that likely will increase.

ACTIVE INSURGENCIES

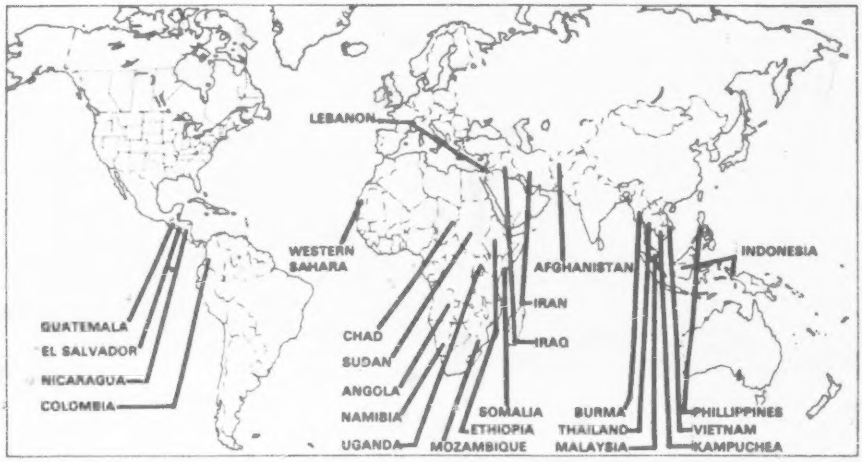

LEBANON
WESTERN SAHARA
AFGHANISTAN
INDONESIA
IRAN
IRAQ
GUATEMALA
EL SALVADOR
NICARAGUA
COLOMBIA
CHAD
SUDAN
ANGOLA
NAMIBIA
UGANDA
SOMALIA
ETHIOPIA
MOZAMBIQUE
BURMA
THAILAND
MALAYSIA
PHILLIPPINES
VIETNAM
KAMPUCHEA

Figure 1.5

Africa will also remain volatile for the foreseeable future. Internal antagonisms and perennial regional tensions occasionally will flare up in violence, frequently without warning or from unexpected quarters. This volatility continues to threaten the development of viable and stable social and economic systems.

In Asia, Vietnamese expansionism, supported by the Soviets, threatens our friends, especially Thailand The potential for conflict on the Korean peninsula remains and Philippine instability is a major concern. Furthermore, the Soviet's significant naval and air presence at Cam Ranh Bay, Vietnam enhances their operational capabilities in the South China Sea, Indian Ocean, and eastern Pacific Ocean, and the island nations they contain.

Terrorism. The rise of international terrorism has become one of the more immediate challenges to U.S. interests and our military forces around the world. Because of the publicity such attacks draw, U.S. military personnel and installations likely will continue to be terrorist targets. Despite limited successes that some governments have scored in combating terrorism, the number and lethality of international terrorist incidents continue to increase.

In addition, some governments are using terrorist tactics, employing terrorist groups, or exploiting terrorist incidents as a mode of surrogate warfare. Terrorism's attraction for these governments is that it allows them to pursue destabilization efforts as an alternative to open, armed conflicts. Thus, it gives them disproportionate influence over international politics that they could not acquire conventionally.

Summary. The range of threats for which the Army must prepare is wider and greater than at any time since World War II. Although general war is the least probable form of conflict today, its consequences would be the

MAJOR SOVIET EQUIPMENT DELIVERIES 1980-1984

	NEAR EAST AND SOUTH ASIA	SUB-SAHARAN AFRICA	LATIN AMERICA	EAST ASIA AND PACIFIC	TOTAL
TANKS/SELF-PROPELLED GUNS	3,160	500	405	320	4,385
LIGHT ARMOR	5,640	770	195	230	6,835
ARTILLERY	3,590	1,860	775	310	6,535
MAJOR SURFACE COMBATANTS	21	4	4	3	32
MINOR SURFACE COMBATANTS	23	17	38	41	119
SUBMARINES	5	0	2	0	7
MISSILE ATTACK BOATS	16	9	6	6	37
SUPERSONIC AIRCRAFT	1,360	305	135	205	2,005
SUBSONIC AIRCRAFT	105	5	0	10	120
HELICOPTERS	585	140	80	75	880
OTHER COMBAT AIRCRAFT	200	65	30	70	365
SURFACE-TO-AIR MISSILES	7,480	545	920	360	9,295

Figure 1.6

most disastrous. More probable contingencies are regional conflicts in the Middle East, Asia, or Latin America. At a time when the United States has relatively fewer resources and greater commitments, we face a world scene where U.S. interests are likely to be threatened increasingly by low-intensity conflict, terrorism, and by a powerful adversary bent on global dominance.

In addressing threats to our national interests, the United States must remain mindful of its national purpose and its values as a democracy and the leader of the Free World. In seeking to counter the threat, we must mirror neither the Soviet Union's authoritarian policy nor its aggressive goals. Furthermore, we need not mindlessly mimic their spending priorities or individual armament programs. Rather, to foster our values and protect our interests, we must carefully and efficiently build balanced forces to address specific threats and to meet the challenges of a changing world.

THE RESPONSE: BALANCED FORCES TO MEET A CHANGING WORLD

Landpower. The United States creates landpower through the joint effort of all services; but, the Army is charged specifically to organize, train, and equip forces to conduct prompt and sustained combat operations on land. To accomplish this mission, the Army designs and builds forces based on requirements of national military strategy, assessments of rapidly changing threats, and the expressed needs of the warfighting commanders. The result is an Army that provides the nation with an essential capability *to deter* wars before they start, *to control* wars if they do start, and *to terminate* wars on terms favorable to U.S. interests.

In the role of peacetime presence, deployed Army forces are the nation's clearest, most highly visible symbol of commitment. Furthermore, in an era when the strategic and theater nuclear balance has decreased the ability of both sides to threaten credibly the use of nuclear weapons, healthy ground forces have taken on an especially important role in the deterrence of all types of conflict. They are the ultimate symbol of American will, the centerpiece of flexibility in a flexible response strategy, an indispensable tool to escalate or deescalate a conflict, and a highly visible deterrent to an adversary's adventurism.

To deter or deal with conflict today, the United States must adapt to the nature of conflict in a world that has become more complex, more crowded, and more contentious. We must continue to uphold our vital interests in areas of traditional concern, such as NATO; and, recent history suggests we must also combat newer threats, such as terrorism, that may challenge our interests anywhere in the world. There are many more potential requirements than fiscal reality will support. Thus, we seek to provide a potent force, balanced to counter the most threatening eventualities, but flexible enough to meet other contingencies.

A number of important factors are shaping Army posture. First, the threat continues to grow in sophistication and extent. The high-intensity warfare threat requires capitalizing on our technological advantages to overcome quantitative weaknesses in our forces. The low- to mid-intensity threat which is more likely to challenge our national interests given the international situation we face, calls for development of rapidly deployable forces and special operations capabilities. Toward this goal, we are improving our force projection capabilities with light infantry divisions, special forces and ranger units. Second, our AirLand Battle doctrine builds on warfighting capabilities by emphasizing tactical and operational maneuver as well as firepower. Third, the Army continues to hold the active strength constant while increasing Reserve Component strength. Demographics as well as fiscal factors underlie this policy.

AirLand Battle doctrine draws on national strengths in the quality of our people and the innovativeness inherent in our society. In addition, it considers our national strategy and Soviet quantitative advantages and operational concepts. The success of AirLand Battle depends on our ability to adhere to its tenets: initiative, depth, agility, and synchronization. Existing Army programs lay the foundation to permit the execution of Army operations according to these tenets. Initiative is achieved through quick strikes, rapid maneuver, and massed firepower. Speed, maneuverability, and accurate, lethal systems are fundamental. Deep operations will extend the depth of the battlefield into the enemy's rear area, destroying and disrupting enemy reinforcements, command and control centers, and vital logistical nodes. Deep attacks will be essential to destroy Soviet timing and break the pace of relentless pressure against our defending Army. These operations will require tremendous agility and the ability to synchronize the efforts of our forces through improved battlefield intelligence, communication, and ability to react quickly to changing conditions. Rigorous training and initiative by both soldiers and leaders will be critical.

In the face of the expanding threats to U.S. interests, the development of forces that are more ready, lethal, and deployable is a strategic imperative for today's Army. The threats with a higher likelihood of incidence are at the lower end of the conflict continuum. As these forms of conflict require forces and equipment which are specially tailored, we have developed forces which are effective at this level, and also capable at other levels of conflict. In addition to expansion of Special Operations Forces, the light infantry division initiative is focused on these requirements. These divisions are specially tailored forces, designed to be quickly deployable, easy to sustain, and capable of vigorous combat. They contain a higher fighter to supporter ratio than other divisions, emphasize maneuver and infantry field craft skills, and possess enough organic tactical mobility to move one-third of their combat force by helicopter and ground vehicles in a single operation. Along with the light infantry initiative, we are pursuing other actions to increase the rapid deployability of Army forces. Where possible, we are lightening forces, equipment and sustainment needs to reduce sizes and loads for movement. Major prepositioning programs are continuing, enhancing our effort to shift major forces strategically in a timely fashion.

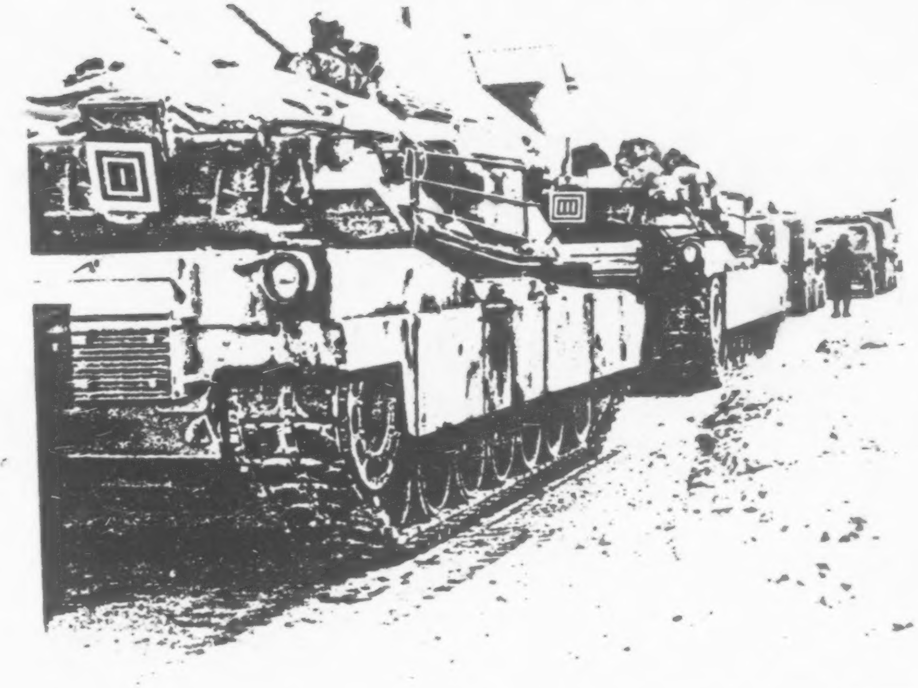
The Army must strike an appropriate balance among types of forces (heavy, light, and special), between U.S.-based and forward-deployed forces, between combat and support forces, and between Active and Reserve Components. Balance does not imply equal parts, but rather the achievement of optimal force ratios to meet our defense needs successfully. In conjunction with military support and assistance offered to other nations, the Army responsibly provides a balance in military capabilities to improve prospects for deterring and combating threats to U.S. interests both today and in the future.

MILITARY CAPABILITIES

The FY 87 budget provides for continued improvements in military capability. However, due to resource constraints, the momemtum established in the early 1980s will slow considerably, especially in modernization and sustainability. This slow down occurs at a time when our major potential adversary is making major qualitative improvements and continues to increase his enormous quantitative land force advantage. Without continued essential modernization and force structure improvements, our recent positive trend in risk reduction cannot be sustained. In addition, potential major reductions to the proposed FY 87 budget may be required under the provisions of the Balanced Budget and Emergency Deficit Control Act of 1985, known as the Gramm-Rudman-Hollings amendment. These potential cuts, combined with the extant cuts from the impact of Gramm-Rudman-Hollings provisions on the FY 86 appropriations, may have dramatic negative consequences on our deterrence and warfighting capabilities.

Military capabilities are commonly measured in terms of readiness, sustainability, modernization, and force structure indicators. In addition to these common measures, the Army's capabilities are influenced by factors such as jointness, stewardship and leadership. In each of these areas the momentum of the last several years will continue and the positive climate established by these initiatives will markedly influence the Army today and tomorrow.

Readiness. Readiness is the Army's top priority. The combination of new equipment, tough and realistic training, effective support, and the highest quality soldiers in the Army's history are visible evidence of the Army's improving readiness posture. Since 1980, 73 battalions and 44 additional companies have been modernized with new equipment. Range modernization and training device expenditures have increased over 500 percent. Training at the National Training Center has



expanded to and is now sustained at 26 battalions annually. Ninety-one percent of Active Army recruits are high school diploma graduates, up 36 percent; and 82 percent of Reserve Component recruits have high school diplomas. To achieve the goal to have all forward deployed and early deploying units in one of the two highest readiness categories within the next five years, the FY 87 budget reflects continued emphasis on readiness. However, resource constraints jeopardize the maintenance of the established pace. Emphasizing high payoff programs, the Army has focused readiness initiatives toward maintaining a quality, combat ready force, enhancing Reserve Component support, and continuing adequate support and operating tempos for both active and reserve training. Coupled with creative leadership and the use of training devices, the maintenance of adequate operating tempos ensures necessary training opportunities using the equipment with which the Army will fight.

Modernization. The core of the Army modernization effort is oriented toward providing the capabilities needed for AirLand Battle. While we have made great strides in fighting capability through modernization during this decade, in FY 87 the pace of equipment procurement will slow markedly. Essential modernization continues, but the reduced momentum in providing effective equipment for the modern battlefield has adverse implications for future capability. Effective stewardship through maintenance of economic production rates and existing multiyear procurements, coupled with an acquisition strategy to provide unit sets of new equipment to those most likely to be the first to fight, will continue. While this assures economic and militarily sound fielding of equipment, the reduced procurement momentum may signal the potential erosion of the Army's recent qualitative gains. The Army is midstream in its modernization of close battle forces and is only beginning to procure effective deep battle systems. The continued procurement of modern conventional systems is imperative for increased conventional capability and its concomitant deterrent ability. Chemical retaliatory capability through binary munitions, and air defense cover for front line forces are pressing needs. Consistent with the Reserve Components' increased mission requirements, initiatives to accelerate modernization of these vital forces continue. The importance of a strong technology base is manifest in the commitment to real growth in the Research, Development, Test and Evaluation account.

Force Structure. The Army is structurally sound and flexible. Designed to capitalize on the modern equipment being fielded and to employ the warfighting doctrine of AirLand Battle, the Army is structuring a 28 division force and expanded Special Operations Forces capability to meet the global requirements of today's strategic environment. With the continuation of the deliberate constraint on Active Army end strength, the reliance and emphasis on the Reserve Components is maintained. Moreover, force structure adjustments are being made to enhance the corps commander's capability to influence the operational level of war in accord with our doctrine and to improve our combat service support sustaining capabilities. Recent developments in the light force structure, exemplified by activations and conversions to the light infantry division design, have improved capabilities to respond rapidly to anticipated threats. They provide the National Command Authorities an essential degree of flexibility to respond rapidly and decisively in the critical first days of a crisis. These light force initiatives continue in FY 87 as the Army moves toward creation of five light infantry divisions. The heavier forces, primarily mechanized and armored divisions, continue to streamline their designs as they fill with modern, more capable equipment. The Army plans to complete conversion of these divisions over the next five years. Productivity enhancements allow the implementation of more effective service support structures for combat forces. The efficiencies from these changes translate into improvements in the "tooth to tail"ratio—the ratio of combat forces to support forces. This use of technology, coupled with improved administrative efficiency and reductions in staffs, has enabled the Army to increase combat power and improve combat service support capability without adding to active end strength.

Sustainment. Improved sustainment is the result of a combination of approaches to organization, equipment, and stockage. Efforts to provide more efficient and effective support systems and more durable equipment have received increased emphasis in recent years. Improvements from these efforts are beginning to be realized. Ammunition and petroleum transportation and distribution equipment are examples of improvements that increase capability and reduce manpower requirements. Allocation rules and workload factors for combat service support units have been reviewed and updated to ensure requirements reflect modern support capabilities. Examples include efficiencies obtained through implementation of the new Army Maintenance System and Logistics Unit Productivity Systems. The new units have increased capabilities and, therefore, have a greater ability to satisfy sustainment requirements. Furthermore, planned activations in the Reserve Components will nearly eliminate manpower shortfalls in combat service support units by the end of the decade. Even though modernization and force structure initiatives cause constant adjustment in war stockage levels, the progress of recent years in improving our war reserve stocks continues. However, the rate of build up will be slowed due to reduced procurement of munitions and spares. The Army continues progress toward achieving 80 percent of our munitions war reserve objective and 70 percent of our secondary items objective during the next five years.

Jointness. Cross-service cooperation or jointness, critical to warfighting, is essential to achieving maximum combat capability from the operative arms of military power—landpower, seapower, and airpower. By capitalizing on each service's inherent strengths, complementary rather than duplicative programs can enhance the overall capability of the services by efficiently filling voids in individual service capabilities while allowing each service to focus on what it does best. This results in near term cost avoidance and longer term improvements in warfighting effectiveness. The Joint Force Development Process provides the institutional framework for Army-Air Force initiatives. To date successes in these efforts have ranged from clarifying joint warfighting doctrine to avoiding over $1 billion in potential program costs. Similar agreements with the Navy in such areas as logistics-over-the-shore are also improving service capabilities. The Army has been at the forefront of cross-service initiatives and continues to lead efforts to expand and institutionalize jointness.

Stewardship. The most precious resources entrusted to the care and leadership of the Army are the soldiers who volunteer to protect the freedoms of the nation. Accompanying that trust is the responsibility to employ effectively and efficiently the other resources allocated to achieve the Army's strength and combat readiness. Stewardship of these resources encompasses actions that improve the quality of life for soldiers and their families, enhance productivity of soldiers and units, increase the efficiency of weapons acquisition, and provide effective operational systems to employ the talents of high quality soldiers.

Initiatives to standardize installation organization and, through decentralization, to encourage innovation in installation operations are improving productivity. Furthermore, continuing review of force integration plans identify potential problems early enough to initiate changes before they impinge on fielding and sustainability. Establishment of a Competition Advocate has assisted in increasing the percentage of competitively awarded procurement dollars to nearly 47 percent. Parallel to this initiative has been an increase in monitoring existing contracts for fraud, waste, and abuse. This effort has resulted in a substantial increase in debarments and suspensions as well as the recovery of over $3 million from contractors who defrauded the government. The Army is actively addressing and meeting the imperative to integrate quality soldiers, modern equipment, and sound operational concepts into effective deterrent and warfighting capability.

Leadership and Values. In recognition of the benefits positive leadership provides to the Army, the Army theme for 1985 was "Leadership." The theme of "Leadership" served to ensure that leaders and those they lead maintain a warrior spirit prepared to fight if called upon. Capturing the thrusts of previous themes—spirit, fitness, excellence, family, and leadership—the theme for 1986 is "Values." This theme serves to reaffirm our commitment to the values we are sworn to defend as well as the professional and personal values which support the Army way of life. This focus on leadership and values also highlights that the Army's most important asset is its people and good leaders and soldiers, steeped in the values that make this nation great, are the difference in war and in peace.

DIRECTIONS

As the Army moves toward the 21st century, solid directions have been established. Effective planning is essential to ensure that decisions made today give the Army capabilities to meet the future threat and execute the nation's military strategy. The Army is focusing on high leverage initiatives that will provide significant improvement in its warfighting capabilities. The Army will proceed along vectors that provide direction, focus and continuity during the remainder of this century. These vectors are:

- Provide quality soldiers in the Active and Reserve Components;
- Fight and sustain as part of joint and combined forces;
- Field a flexible, sustainable, modernized force to fight across the conflict spectrum;
- Exploit operational and tactical dimensions of AirLand Battle doctrine;
- Develop and exploit high technology and productivity enhancements;
- Improve tactical and strategic deployability.

The remainder of this statement explains our plans to accomplish our goals. In Chapter II we detail the structuring, manning, modernizing, training, deploying, and sustaining programs for the Army. The third chapter explains how we are providing stewardship for the resources given to our care. In Chapter IV we provide the long-term directions for the Army. The last chapter provides an overview of the FY 87 budget.

Fiscal Year 1987 offers the opportunity to continue, albeit at a slower pace, the momentum of previous years and to move forward in directions that assure the nation has landpower second to none. With the support of Congress and the American people, the Army will continue to build and maintain an Army of Excellence: Ready, Responsive, and Responsible.

TODAY'S ARMY: READY AND CAPABLE

Building a ready and capable Army remains the Army's first priority. The success of this effort is visibly evident in Army units, both Active and Reserve Component, that have better soldiers, more and better equipment, better training, and better support. Efforts are being taken to improve the management of equipment readiness. For example, using improved resource allocation programs, more than 144 units have been raised to a combat ready status. Furthermore, the influx of new high quality equipment and redistribution of older, but still capable equipment, is redressing some long standing equipment shortfalls. Despite these recent substantial improvements, challenges abound. Especially in an era of constrained resources, responsible efforts must continue to enhance Army readiness and capability.

Numerous initiatives are underway to create an Army which is more flexible in meeting its missions. The resulting force will be more effective, more easily deployable, and will have a more favorable tooth-to-tail ratio. The recent introduction of the light infantry divisions will enable the Army to respond quickly to a wide variety of threats throughout the world. To help develop this important initiative, the Army is finding innovative ways to reduce the support burden on the deployed force and to accomplish remaining tasks more efficiently. The Abrams tank and the Multiple Launch Rocket System are two examples of new systems which have resulted in a significant enhancement of our total force capability. They highlight the synergy of technology and sound doctrine that provides the qualitative edge to overcome quantitative disadvantages.

The Army relies more than ever before upon its Reserve Components (RC) to meet today's challenges and to counter tomorrow's threats. Our experience in many parts of the world clearly reinforces the importance of the reserves if the Army is to achieve its goal of deterring war. Focusing the Army National Guard (ARNG) and U.S. Army Reserve (USAR) on appropriate missions and providing them necessary support have made these forces better prepared to meet their wartime commitments today than at any previous time in peacetime history. Through their improved readiness they serve today as fully contributing partners in the Army's mission of deterring war.

The Capstone Program, which links RC units to a specific wartime mission and gaining command, is being used to improve RC planning, training, and resource priorities. The equipment status of some RC units has been accelerated using the "first to fight are first equipped" approach. Furthermore, later deploying units, primarily in the Guard and Reserve, need equipment to train on now. The Minimum Essential Equipment for Training (MEET) program, initiated in 1983, has been very successful in improving the ability of RC unit commanders to provide realistic training for their soldiers. The initial phase of this program identified approximately 500 units and 500 different types of equipment that were required. The training of over 300 of these units has been improved. This equipment was made available from planned procurement, existing stocks and redistribution.

The focus on recruiting and retaining high quality soldiers has been and will continue to be our best investment. Increasing the fill of Prepositioned Materiel Configured to Unit Sets (POMCUS) will further reduce deployment times and strategic lift requirements to reinforce Europe. Investments in simulations underscore our commitment to improve the quality of training, make maximum use of limited training time and real estate, and reduce the cost of training. The National Training Center serves as a prime example of how simulations can be used to improve training. Efforts to develop and capitalize on new technology, and to coordinate better with the other services to improve efficiencies and plan for "jointness" will further support the Army's efforts to make readiness first priority in a resource constrained environment.

All other efforts are wasted if we cannot sustain our forces once they are committed. Increases in war reserve stocks, medical support, water resupply assets, and the Individual Ready Reserve are some of the ways sustainability is being improved.

The foundation of our efforts to enhance readiness is the action being taken to foster good leadership throughout the Army. This effort involves more emphasis on professional schooling, more awareness of the operational art, and more attention to standards of performance. Good leaders will be effective stewards of the Army's readiness dollars.

Accurate, comprehensive assessments are necessary to determine our ability to execute operations plans, to provide insights into weakness in our ability to mobilize, deploy, fight, and sustain the force; and to show changes in capability over time. Efforts are underway to enhance capability assessment.

A new warfighting model which will better portray the deep battle, the battle in the rear areas, and the effects of logistics shortfalls is being incorporated into the Army's Operational Readiness Analysis (OMNIBUS), a key analytical tool for assessing total force readiness. A baseline methodology is being developed that will provide a measurement of capability independent of changes in the threat as well as capability including changes in the threat.

The Total Logistics Readiness/Sustainability Study is an annual comprehensive analysis that assesses the Army's current capability to sustain logistically forces deployed in support of its principal operational plans. This study, and the OMNIBUS development and warfighting analysis provide vital information about total force capability and possible enhancements.

Another key tool for assessing capability is the Measuring Improved Capabilities of Army Forces (MICAF) study. MICAF quantifies capability improvements in Army divisions, separate brigades and armored cavalry regiments. Since 1980, the capability of the Army's major combat units has increased 40 percent. Future MICAF enhancements will provide information on improvements needed to optimize capability and will assess the effects of budget decrements.

Through these initiatives, the Army is making great strides in its ability to assess its current capabilities and to undertake actions that provide the most effective ready force possible. Even though much work remains to offset long standing shortfalls, the improvements in Army capability have produced a force that stands as a visible symbol of this nation's deterrent posture and its resolve to protect its vital interests.

DOCTRINE FOR TODAY

In support of national military strategy, the Army must have doctrine that provides the basis for conducting operations across the spectrum of potential conflicts. Drawing on history and capitalizing on inherent advantages in technology, leadership, and quality soldiers, the recent evolution of the Army's doctrine has influenced everything from unit organizations through equipment design to soldier training.

The AirLand Battle. The Army's combat doctrine is called the "AirLand Battle." This doctrine reflects time tested theories and principles, and fundamental concepts about modern war. The AirLand Battle doctrine provides the bedrock for the structure of more specific "how to fight, lead, sustain, and train" concepts. Recent refinements reflect what we have learned during the past four years about AirLand Battle, clear up issues raised by allies and the other services, and reflect a stronger emphasis on joint and combined operations.

Forces, under AirLand Battle, will seize the initiative through a violent disruption-destruction sequence and then defeat enemy forces in detail. Relying on rapid seizure and retention of the tactical initiative, AirLand Battle seeks, through maneuver, to confront the enemy's engaged forces with unforeseen threats more rapidly than they can react to them, while simultaneously disrupting and destroying the reinforcing echelons upon which he depends for victory.

The Army seldom will fight alone. Since 1983, the U.S. Air Force has agreed to use AirLand Battle doctrine in conjunction with its Aerospace Operational doctrine as the basis for joint combat operations. When Army forces are deployed in allied or coalition operations, AirLand Battle doctrine is adaptable to allied political and military guidelines, procedures and operational plans. AirLand Battle is compatible and complementary to NATO's strategy and operational concepts to include the Follow-on Forces Attack concept for deep operations.

AirLand Battle doctrine is the central rationale that guides the Army's development of its forces to meet national security missions. Quality training, sound leadership, modernized equipment and a viable force structure, guided by AirLand Battle doctrine, will enable the U.S. Army to fight and win in combat world-wide.

Low Intensity Conflict Doctrine. The Army also is addressing the issue of Low Intensity Conflict (LIC) doctrine. The U.S. Army Training and Doctrine Command (TRADOC), as the executive agent for the Army, is coordinating a Joint Low Intensity Conflict Project which is examining the successes and failures in LIC operations to identify issues which will influence doctrine, training, materiel, and organization. These findings will serve as the basis for the LIC operations concept and doctrine.

Arroyo Center. The Arroyo Center, located in California, conducts broad, long-term policy analysis for the Army's leadership. The center is unique in that it addresses topics having major policy implications across the spectrum of Army activities. The center draws its analysis topics from the highest levels of Army leadership. Examples of major study topics are exploring the implications of space on Army operations, applications of robotics and artificial intelligence, and implications of low intensity conflict. Joint efforts include assessing the potential enhancement of conventional NATO defense as well as an examination of air defense with the Air Force.

The Army in Space. The Army has been involved in space-related developments since the 1940s. The first U.S. satellite was launched in 1958 by the Army. In 1961 the Army's Redstone rocket put the first two Americans in space. The Army conducted the first successful Intercontinental Ballistic Missile intercept in 1984, the first demonstration of nonnuclear kill in space of a reentry vehicle. In 1973, the Army initiated service and defense agency efforts to exploit nationally controlled satellite systems to support operational and tactical commanders.

While there is a shortfall in the availability of fully qualified personnel to fill the rapidly expanding requirements for Army space-related expertise, a concerted effort has been undertaken to ensure a pool of qualified officer and civilian personnel exists to meet requirements. The Army must continue to ensure that its needs for support of the AirLand Battle are incorporated during development of joint-service and DOD space systems.

STRUCTURING THE ARMY

In response to a broadening spectrum of threats, today's Army has been restructured to capitalize on technology and to employ the AirLand Battle doctrine in diverse and distant geographic settings. This effort has resulted in the creation of a balanced force of heavy, light, and special operations units streamlined to execute AirLand Battle doctrine. The Army is organized to employ the modern equipment now coming on line, to sustain that equipment on the modern battlefield and to capitalize on productivity enhancing technology. This restructuring has been accomplished within a deliberately fixed Active Component (AC) end strength because of national demographic considerations and the need to have a reasonable portion of our constrained resources committed to force modernization, readiness, and sustainability requirements. As a result, we have integrated RC units with the active force to a degree unprecedented in recent history. The Total Army is a fact.

As of September 1987, the Army force authorizations mix by percentage of combat function is programmed to be:

	Active Army	National Guard	Army Reserve
Combat	49	44	7
Support	48	19	33

By percentage of function within each component:

	Active Army	National Guard	Army Reserve
Combat	52	71	19
Support	48	29	81

The Corps. The corps is the Army's largest tactical organization. Usually subordinate to field armies or army groups, the corps will be the primary instrument for achieving operational objectives and it will fight to win battles. Corps' ground operations must be closely synchronized with supporting air operations and theater sustainment operations. Depending on circumstances, it may exercise tactical and operational level responsibilities.

AirLand Battle doctrine places increased responsibility on the corps commander to integrate the major operations (close, deep, rear) of the battle. The overall structure of the corps is being redesigned to provide the corps commander the assets necessary to fight, control and sustain simultaneously three separate operations. The proposed revisions of the corps structure are based on the combat capabilities and sustainment requirements of the redesigned divisions and upon prudent assumptions where division and separate brigade designs are not yet complete. The alternative corps designs incorporate the following changes:

- Increase the capability of the corps signal brigade;
- Transfer division Chaparral and add Hawk battalions to the corps air defense artillery brigade;
- Strengthen the corps military police brigade;
- Provide human intelligence capability within the corps;
- Transfer of 8-inch field artillery cannons to the corps, convert cannon artillery battalions to three 8-gun batteries;
- Add a Mutiple Launch Rocket System (MLRS) battalion and a target acquisition battalion with remotely piloted vehicles to corps artillery;
- Add attack helicopter battalions to the corps aviation brigade.

Refinement of Heavier Force Designs. Army design models provide for an armored division of about 16,800 members (6 tank, 4 mechanized infantry battalions) and a mechanized infantry division of approximately 17,100 (5 tank, 5 mechanized infantry battalions). The design retains the increase from three to four in the number of tank and infantry companies assigned to maneuver battalions. These companies are being equipped with the Abrams tank and Bradley Fighting Vehicle. The division support command provides a forward support battalion to each brigade and a main support battalion within the division rear area. A long range surveillance detachment has been placed in the divisional cavalry squadron. Infantry squads and 155mm howitzer sections have been reduced to nine men each. The 8-inch howitzer batteries have been moved to corps and a battery of MLRS has been retained as a divisional general support weapon. During FY 87 heavy forces in both Europe and the Continental United States (CONUS) will continue conversion to the refined unit designs as associated new equipment is fielded and facilities become available. Reserve Component affiliation with selected units continues, with roundout units converting to new unit designs about the same time as their associated AC unit.

The modern design for the 2nd Infantry Division in Korea was approved in May 1985. The new design considers the unique requirements for this forward deployed division and provides increased firepower through the use of modern equipment while staying within required space authorizations.

The 9th Infantry Division was tasked to develop innovative tactics and equipment that would evolve for use in a new type division. In September 1985, the Army leadership approved an interim design for a motorized division. This design includes three infantry brigade headquarters, five heavy combined arms battalions, two light combined arms battalions, and two light attack battalions. The division also includes a combat aviation brigade. The division's tactics and equipment emphasize high tactical mobility combined with extensive firepower. However, the division retains strategic mobility more comparable to the light division.

Organization of the Lighter Forces. In FY 87 the Army will continue the process of creating more deployable, relevant lighter forces. The activation and conversion to five light infantry divisions—four in the AC, one in the ARNG—continues. Both the air assault and the airborne division will complete conversion in FY 87.

The 7th Infantry Division (Light) completed its conversion to the light infantry design in FY 85, and in FY 86 undergoes a year-long certification. The 25th Infantry Division in Hawaii is converting to the light infantry design in FY 86. Lessons learned during the conversion of the 7th Infantry Division (Light) will be applied to the other light divisions' conversions.

The 10th Mountain Division (Light Infantry), which was activated as a new division in FY 85, continues its growth in FY 86 and FY 87. The pace of growth will be determined by the availability of facilities, particularly family housing, at Fort Drum, New York. During FY 86, the 10th will continue building its combat structure by activating two infantry brigade headquarters, four infantry battalions and one field artillery battalion. Additions to the combat service support structure begun in FY 85 will continue. One of the division's infantry brigades will be stationed temporarily at Fort Benning, Georgia, until adequate facilities are available at Fort Drum in FY 89. The division will have the 27th Brigade of the New York Army National Guard as a roundout brigade.

During FY 86, the Army will activate an additional light infantry division in the active force and complete reactivation of another in the RC. The 6th Infantry Division (Light) will be activated in 1986 at Forts Wainwright and Richardson, Alaska. This new division is formed around the existing 172nd Infantry Brigade already stationed in Alaska. The 205th Separate Infantry Brigade, U.S. Army Reserve, headquartered in Minnesota will roundout the division. The division's primary mission will be the defense of Alaska. The 29th Infantry Division (Light), Army National Guard is the Army's tenth National Guard division.

Headquartered at Fort Belvoir, Virginia and based on the assets of the 116th Separate Infantry Brigade (Virginia) and the 58th Separate Infantry Brigade (Maryland), the division will complete its reactivation as a light division during FY 86.

In August 1984, the Army approved new force designs for the air assault and airborne divisions. The air assault division begins conversion to the new design in FY 86; the airborne division is scheduled to convert to the new design in FY 87. The airborne and air assault division structures are based upon the light infantry division force design modified to consider unique mission requirements and the need for specialized training. Both divisions will be more readily deployable with increased tactical mobility, possess improved reconnaissance capabilities, a broader range of communications assets, and organic nuclear, biological, chemical decontamination capabilities and smoke support.

Special Operations Forces. The Army provides highly specialized forces as part of the land force mission. Special Operations Forces (SOF) complement conventional capabilities across the conflict spectrum, but are uniquely suited for limited objective operations at the lower end of the spectrum. The Grenada operation in 1983 illustrates the flexibility of SOF working with conventional forces in responding to a destabilized political situation. Army Rangers seized control of the airport, secured U.S. citizens being held hostage, and evacuated the American non-combatants while maintaining pressure on the enemy until relieved by conventional Army forces. Other efforts by SOF included participation by psychological operations units and a 30 member USAR civil affairs unit which assisted in restoring community support functions. The operation demonstrated the major thrust of SOF strategic employment while displaying the Army's capability for force projection in support of U.S. interests. SOF (Special Forces, Rangers, civil affairs and psychological operations units, Special Operations Aviation) provide the National Command Authorities a cost effective, politically acceptable, and feasible means of responding to threats without incurring the liabilities of large, highly visible, and expensive conventional forces.

The continued revitalization of SOF is a high Army priority. The Army SOF Master Plan identifies requirements and guides the enhancement effort for the period FY 86-90. A SOF Modernization Action Program, approved in May 1985, serves as the guidance for Army SOF modernization. The plan outlines required corrective actions, sets milestones and assigns responsibility for resolving deficiencies.

During FY 86, the manning level of the Special Warfare Center will be increased. The 1st Special Operations Command (SOCOM) will be improved by activation of a support battalion, a signal battalion and increased manning levels in military intelligence units. Future force structure enhancements will increase the number of psychological operations, special forces, and special operations aviation units. Growth trends through the FY 91 projection are shown in Figure 2.1.

The RC provide a substantial contribution to Army SOF. Fifty percent of the special forces and 90 percent of the psychological operations and civil affairs units are in the RC. Equipment modernization actions are planned to improve the warfighting capability of RC SOF. Mobilization requirements for some RC SOF units will be increased with additions being made in special call-up authority.

In May 1984, the Army and Air Force Chiefs of Staff agreed to an initiative that would transfer all SOF-rotary wing aviation support to the Army. Both services have worked to develop appropriate implementation plans that ensure national capability is maintained and to allow for growth in aviation capabilities to meet requirements better. The Army is planning to activate a Special Operations Aviation Brigade composed of both AC and RC aviation units. Because aviation support for SOF remains an important joint service responsibility, the Army and the Air Force will continue to improve their SOF aviation capabilities.

Security Assistance. Security Assistance (SA) is an integral part of the Army's ability to deter or respond to threats to U.S. interests. The Army supports SA as a principal tool of national security policy to strengthen regional

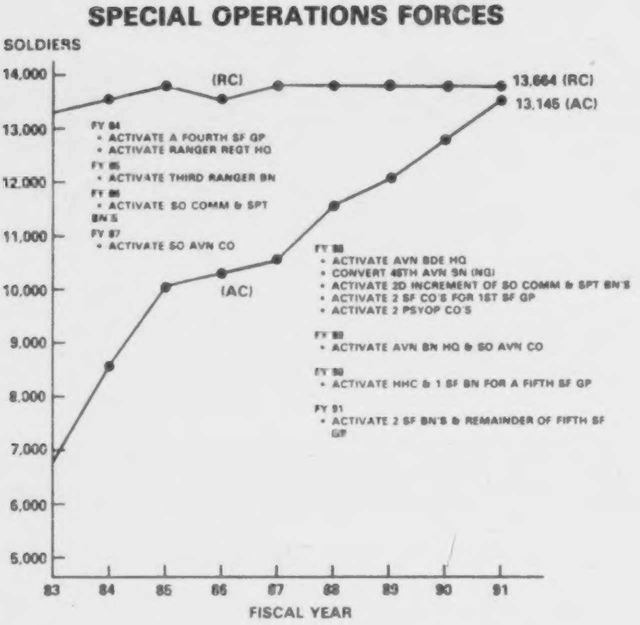


Figure 2.1

defenses. SA supports key friends and allies with nation building and self-defense resources and advice while preserving advanced technology and combat readiness.

As of the end of FY 85, there were approximately 6,400 open Army SA programs for equipment and services valued in excess of $44 billion, involving over 100 countries and international organizations (e.g., NATO, Organization of American States, etc.). The Army trained approximately 9,000 students in FY 85 and provided about 11,000 courses, about 98 percent of which were conducted in the United States. These training figures may decrease during FY 86 due to the reimposition of the four-tier pricing formula which substantially increases training costs for NATO countries as well as for those countries which do not participate in the International Military Education and Training program.

A key training vehicle is the United States Army School of the Americas. Its mission is to develop and conduct military training in Spanish, using U.S. doctrine, for Latin American personnel. The purpose is to achieve a higher level of military professionalism and to improve the effectiveness of military education and training in Latin America.

The School of the Americas began training and educating Latin American military personnel in 1947 at Fort Gulick, Panama. The School was moved from Panama in September 1984 to Fort Benning, Georgia. Fort Benning acts as a temporary site until a permanent site decision, expected in early 1986, is made.

The School's projected enrollment in FY 87 is between 24,000 and 28,000 student weeks of instruction, almost doubling FY 79 enrollments. This shows the value Latin American countries attach to the School. The School is an effective tool of our national policy and continued support for the School of the Americas will demonstrate to the Latin American community that U.S. commitment to the region is serious.

MANNING THE ARMY

Soldiers are the heart of today's Army. In recent years, efforts to recruit and retain quality soldiers have been successful as evidenced by the readiness and competency of our present force. However, the future demands that we keep pace with the accelerating changes in manpower requirements due to technological improvements in equipment, modernization of warfighting doctrine and streamlining of units in the force structure. Furthermore, to retain good soldiers, they and their families deserve a quality environment in which to serve and live.

The Army continues to upgrade the quality of the enlisted force and of the Noncommissioned Officer (NCO) corps, in particular, to meet the demands of the modern battlefield. The proliferation of new equipment, the adoption of a doctrine of warfare that emphasizes maneuver, and the importance of small units in low-intensity conflicts reinforce the wisdom of this effort. The Army fields systems in unit packages and employs doctrine to achieve the maximum lethality of these systems. For the Army to be effective, soldiers, equipment, and doctrine must be compatible. The quality of soldier cannot be diminished without affecting the performance of the weapons systems or the ability of units to execute the Army's warfare doctrine.

In FY 87 the strength of the Active Army remains stable. This, coupled with a slight decline in civilian strength, means we must restructure our existing manpower to accommodate modernization and integrate the modest strength increases in our Reserve Components (RC). Our challenge in meeting these changes is to ensure that soldiers are trained in new specialties, where appropriate, assigned to the right place at the right time, and that our people, both military and civilian, become more productive. The growth of COHORT (Cohesion, Operational Readiness, Training) units, designed to keep soldiers together for longer periods of time, will make a major change in the culture of the Army and will improve unit cohesion and overall readiness.

Although our enlisted recruiting and officer accession programs have met their numbers and quality goals, our future needs offer an even greater challenge. Based on an improved economy, continued demand for quality youth in the private and public sectors, to include the other services, and a decline in the youth population, the Army must continue to offer bonuses for selected skills and educational incentives for both the accession and retention programs.

About 58 percent of the force is married. As a result, the quality of life for soldiers and families remains a major readiness priority. The Army's Family Action Plan is designed to ensure improvements in all areas. Our goal is to shape a climate that fosters wholesome families and communities within an environment that recognizes the contribution our soldiers make to this Nation. Accordingly, we continue to promote the partnership between the Army and Army families and have identified many of their needs to accomplish this goal.

With the continued support of Congress we will succeed in our recruiting and retention efforts to build a quality Army today for tomorrow's missions throughout the world.

Total End Strength. The active military end strength remained at 780,800 for FY 85 and FY 86. This has been possible by an aggressive civilian substitution program, application of productivity enhancing technology, and transfer of appropriate missions to the RC. Army National Guard (ARNG) selected reserve strength increased from 439,952 in FY 85 to 450,496 in FY 86 and that of the U.S. Army Reserve (USAR) increased from the FY 85 level of 292,080 to 310,650 in FY 86. Through application of aggressive productivity programs and sound management techniques, the Army plans to reduce our civilian strength slightly in FY 86 and FY 87.

The Active Component (AC) strength will increase marginally to approximately 780,900 in FY 87. The Selected Reserve will continue an

TOTAL ARMY END STRENGTH

	FY 85	FY 86	FY 87
ACTIVE ARMY	780,787	780,800	780,900
ARMY NATIONAL GUARD	450,696	460,137	472,505
SELECTED RESERVE*	(439,952)	(450,496)	(462,800)
INACTIVE NATIONAL GUARD	(10,744)	(9,641)	(9,705)
ARMY RESERVE	593,905	629,558	663,727
SELECTED RESERVE**	(292,080)	(310,650)	(327,600)
INDIVIDUAL READY RESERVE	(301,825)	(318,908)	(336,127)
TOTAL MILITARY END STRENGTH***	1,512,819	1,541,946	1,571,300
CIVILIAN****	419,917	412,478	410,530

*INCLUDES ACTIVE GUARD/RESERVE.

**INCLUDES ACTIVE GUARD/RESERVE AND INDIVIDUAL MOBILIZATION AUGMENTEES.

***INCLUDES ACTIVE ARMY AND SELECTED RESERVE ONLY.

****INCLUDES RC TECHNICIANS COUNTED IN RC END STRENGTH ACCOUNTS.

Figure 2.2

upward trend with the ARNG strength increasing to 462,800 and the USAR strength rising to 327,600. Civilian strength in FY 87 has been adjusted for 2,500 ARNG Military Technicians and additional supply and maintenance manpower to comply with core logistics provisions described in the FY 86 Joint Authorization Conference Report. The civilian strength is programmed to remain relatively stable through the out years. This stability in active and civilian strength reflects efforts to improve output through productivity enhancing technology rather than increases in people.

Full-Time Support Program. Since announcement of the Total Force Policy in 1973, the Army has greatly increased the role of the RC. To achieve and maintain a level of readiness commensurate with this role, the ARNG and USAR require a cadre of highly skilled full-time support personnel to assist the part time members of the RCs in achieving their readiness goals.

Active Guard/Reserve soldiers, RC soldiers on active duty, and civilian military technicians, excepted civil service employees who hold a military position in the ARNG or USAR unit they support, are the two major personnel groupings found within the Full-Time Support Program. The unique characteristics of both categories are blended into the full-time unit support cadre of equipment operators, maintainers, trainers and administrators needed by units to achieve the high readiness standards demanded of them. Today's Guard and Reserve environment is characterized by increased mission responsibilities, intense training on high-tech equipment, and the pressure of a compressed deployment schedule that reduces the opportunity for post mobilization training. To be successful the commander must reap the maximum from the limited training time and facilities available. The full-time support force assists the commander in this effort by accomplishing the myriad essential support tasks that permit more mission related unit and individual training.

FULL-TIME SUPPORT STRENGTH

(ACTIVE GUARD/RESERVE (AGR) AND CIVILIAN TECHNICIANS (CT))

	FY85	FY86	FY87
ARNG			
AGR	21,059	23,731	28,721
CT	25,494	26,629	27,129
USAR			
AGR	10,751	12,157	13,657
CT	7,849	7,609	8,032
TOTAL	65,153	70,126	77,539

Figure 2-3

The requested increases in full-time support personnel strength will enable the Guard and Reserve to continue progress toward achieving and maintaining the unprecedented training tempos and capabilities now demanded.

Civilian Strength. The FY 86 Joint Authorization Conference Report extends the test which eliminates civilian strength ceilings into FY 86. This legislation increases significantly the Army's flexibility to manage civilian employment levels without the requirement to meet an arbitrary ceiling on the last day of the fiscal year. FY 85 strength data indicate that while total Army civilian employment grew by about 18,000, full-time permanent employment is below budgeted levels by about 6,800. This experience shows that the Army is using temporary hires to meet work load surges and that the full-time permanent work force is not growing in the absence of ceiling constraints. Had the Army been under an end strength ceiling for FY 85, the ceiling would have been met through the release of over 18,000 temporary hires which causes excessive administrative costs, personnel turbulence, and mission disruption. Estimated administrative costs avoided in FY 85 was $9.3 million.

A continuing initiative to ensure the best use of soldiers is the civilian substitution program. This program converts military positions to civilian, which releases soldiers for duty in essential combat, combat support, and combat service support units, and results in increased readiness. During FY 83-86, the Army converted 5,506 military positions to civilian. Civilian substitution will be further expanded by 3,003 in FY 87 with no growth in total civilian strength over planned FY 86 strength.

Officer Accessions. The goal of the officer accession system is to provide officers of the requisite quantity, quality and academic discipline to satisfy the requirements of the Active Army, Army National Guard, and U.S. Army Reserve. Officer accessions are provided primarily through four precommissioning programs--the United States Military Academy (USMA), the Reserve Officers' Training Corps (ROTC), the Officer Candidate School (OCS) at Fort Benning, Georgia, and State National Guard OCS programs. In FY 85, approximately 1,000 lieutenants were commissioned from USMA, 8,300 from ROTC, 1,000 from OCS, and 1,150 from the State OCS programs.

To assist in providing the Army a West Point graduate with the best, most up-to-date education available, the United States Military Academy has initiated an extensive facilities modernization program. The purchase and renovation of Ladycliff College, renamed New South Post, will free valuable classroom space in the central post area. Renovation will include modernization of classrooms, laboratories, and cadet room furnishings. Whether measured in terms of graduate academic honors or selection for critical positions of military responsibility, West Point continues to provide graduates who exhibit the values, skills, and motivation to lead the Army now and in the future.

ROTC has initiated several recruiting programs to enhance its ability to recruit and produce its officer requirements. They include the ROTC Scholarship Program, the Simultaneous Membership Program (SMP), the Viability Management Program, the Mission Management System (MMS), and the ROTC Advertising Program.

ROTC scholarships increased from 6,500 in school year 80-81 to the present figure of 12,000. Last year over 10,000 students applied for 1,450 four-year scholarships. The SMP is aimed at attracting and retaining ROTC cadets. In FY 85, 6,605 students were simultaneously enrolled in ROTC and assigned to RC troop units. The SMP program allows students to supplement their college income by drawing the pay of an E-5 while serving as an officer trainee.

To improve ROTC production, ROTC cadre are being redistributed to markets of high potential under the Viability Management Program. This program allows the disestablishment of non-productive institutions with a concomitant shift in cadre to more productive ones.

Improved retention, improved management and increased enrollments are necessary to increase the number of officers commissioned from ROTC. Key to the accomplishment of this strategy is the ROTC MMS which will automate enrollment data and allow ROTC to manage production better without increases in manpower. Increased ROTC advertising is required to minimize the drop in the ROTC enrollment propensity of college students.

Three major actions were taken in FY 85 to increase production, standardize training, and improve the distribution of reserve officers. Production of officers from ROTC was programmed to increase from 9,500 in FY 87 to 10,750 in FY 91. Active and reserve OCS programs were consolidated to improve reserve training and eliminate dual system inefficiencies. Finally, a lieutenant's management team was established at the Reserve Component Personnel Center to enhance the distribution of officers to the ARNG. All actions have been completed and are success stories.

Recruiting. The Army College Fund and Enlistment Bonus programs, as well as the two-year enlistment option and increased major media advertising, have contributed to the recruitment of higher Armed Forces Qualifications Test (AFQT) category youth over the last three years. High youth unemployment during FYs 80-83 and, to a lesser extent, FY 84 also contributed to the improved quality of Army accessions. Changes in these factors could influence our ability to man the force in the future.

Figures 2.4, 2.5, and 2.6 show the increased accession quality of the Army. In FY 85 each component of the Army was well within the congressionally mandated ceiling of 20 percent AFQT category IV recruits.

QUALITY OF ACTIVE ARMY ACCESSIONS

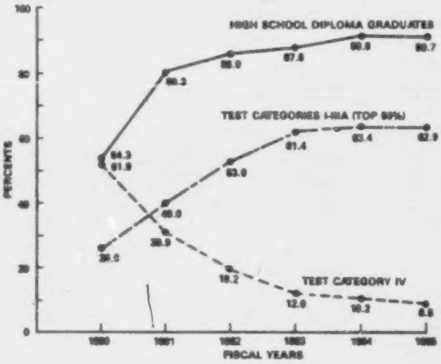


Figure 2.4

QUALITY OF ARNG ACCESSIONS

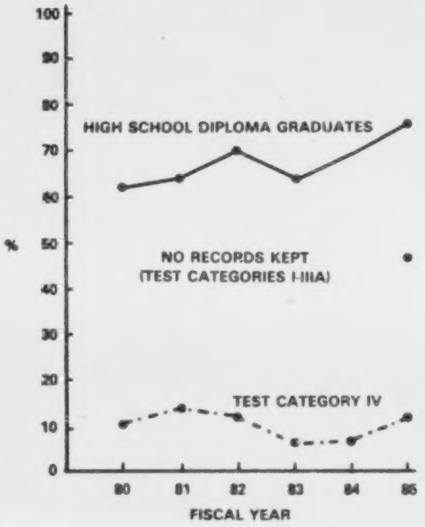


Figure 2.5

QUALITY OF USAR ACCESSIONS

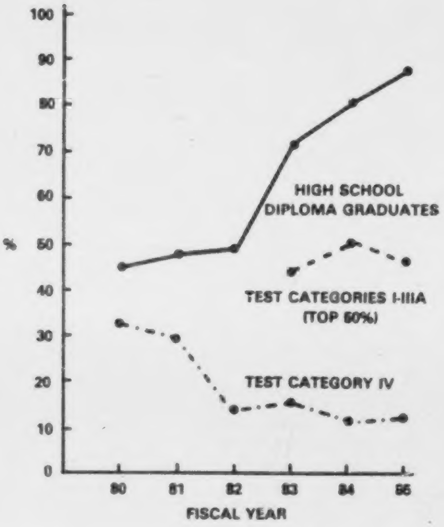


Figure 2.6

U.S. Army Recruiting Command and Army In-Service Recruiters (ISR) accomplished 101.5 percent of their combined mission with 78,862 Army Reserve Troop Unit accessions in FY 85. Additionally, the ISR enlisted 6,856 soldiers from the Individual Ready Reserve (137.1 percent of mission) and referred 20,430 separating AC soldiers to the ARNG for further recruiting (168.8 percent of mission).

The Army expects to maintain the quality content of our accessions during FY 86. Figure 2.7 shows goals in terms of numbers and quality.

To remain competitive in the quality recruiting market the Army uses enhanced educational incentives and enlistment cash bonuses to target qualified individuals for designated skills and/or units. With the potential pool of accessions declining, these incentives are a primary tool to attract, distribute and align quality accessions. The new GI Bill became effective 1 July 1985 and pays benefits of up to $10,800 for active duty personnel and up to $5,040 for Selected Reserve personnel. The Army is authorized to pay certain qualified enlistees additional educational incentives above the basic active duty benefit. These additional benefits are called the New Army College Fund. These "kickers" are $8,000, $12,000, and $14,400 for two-, three-, or four-year enlistments, respectively. Cash bonuses of up to $8,000 for a four-year active duty enlistment and up to $2,000 for a six-year Selected Reserve enlistment are also offered to qualified individuals who enlist in a designated skill and/or unit. The continuation of these incentives is necessary to ensure that the Army achieves its quality and total accession goals.

Reenlistment. Due to the improved quality of Active Army accessions over the last four years, the three-year attrition of first-term soldiers has declined. Army retention policy

TOTAL ARMY ENLISTED ACCESSION PLAN (000)

	FY 86			FY 87		
	ACTIVE ARMY	ARNG	USAR	ACTIVE ARMY	ARNG	USAR
NON-PRIOR SERVICE ACCESSIONS	127.0	47.5	26.1	128.4	51.0	30.0
PRIOR SERVICE ACCESSIONS	8.0	45.0	50.6	11.0	45.0	48.3
TOTAL	135.0	92.5	76.7	139.4	96.0	78.3
HSDG % OF NPS	90.0	75.0	85.5	90.0	76.0	86.5
TC I-IIIA % OF NPS	59-63	47.0	54.0	59-63	48.0	55.0
TC IV % OF NPS	10.0	10.0	10.0	10.0	10.0	10.0

Figure 2.7

focuses on retaining sufficient quality soldiers with leadership potential. However, adequate compensation is essential if the Army is to be successful in retaining high quality soldiers. Current retention trends are similar to those experienced in FY 85. Manpower requirements will be met only if the Army is successful in retaining a higher proportion of top performing soldiers. The new GI Bill contains provisions allowing Vietnam era GI Bill eligible soldiers to participate in the new benefits and remain eligible for all portions of their old benefits. The 1989 expiration date will not affect them. This provision will assist in the retention of career soldiers. However, quality retention may suffer should the recent adverse trend in pay comparability continue. Military pay now lags civilian earnings by 8.3 percent and unless the requested 4 percent raise in FY 87 is approved will likely lag further.

The Selective Reenlistment Bonus (SRB) program provides monetary incentives to soldiers who reenlist in critical skills. This promotes retention of qualified soldiers in order to sustain a trained experienced career force. The SRB is essential to promote reenlistment of proven quality soldiers in selected military occupations and improve force alignment.

The Special Duty Assignment Pay program compensates soldiers for extraordinary effort in the performance of demanding military duties which involve an unusual degree of responsibility and arduousness.

.**The New Manning System.** In 1981, the Active Army implemented a New Manning System (NMS) to improve combat effectiveness by reducing personnel turbulence and fostering unit cohesion, esprit and loyalty in Army units. The program consists of two major subsystems: COHORT (Cohesion, Operational Readiness, Training) Unit Replacement for the Active Army and the U.S. Army Regimental System (USARS). Initially, only the infantry, armor, and cannon field artillery combat arms were involved in the execution of the program. Combat support and combat service support arms have been integrated into the program where practicable and necessary.

Active Army COHORT unit replacement is under development to enhance combat effectiveness by reducing personnel turbulence in combat arms battalion and smaller size units. The concept is based on the precepts of stabilization and unit replacement to foster cohesion and efficiency of training resulting in improved combat readiness. First-term soldiers and career soldiers in battalion size and smaller units will be stabilized within the organization for three to five years. The long-term relationship fosters greater horizontal (peer) and vertical (chain of command) bonding within the unit. In addition, commanders have time to develop long-range training objectives for obtaining higher performance standards than currently attainable with an individual replacement system.

Through calendar year 1985, 122 company size and 13 battalion size units were activated. An additional 23 company size COHORT units will be activated in FY 86 to replace units reaching end-of-life cycle. During FY 87 the COHORT program will activate 16 companies and 11 battalions.

Emerging results of the comparative COHORT to non-COHORT evaluation reflect vastly improved stability (leaders and first termers serving together for a full three years) in COHORT units. The evaluation program will continue to identify the strengths and weaknesses of the COHORT unit replacement program. Comparison of COHORT to non-COHORT units will provide readiness and costing data for determining progress with the program and adjustments required to expand unit involvement on a deliberate growth path through Army-wide participation. The COHORT unit replacement program will remain consistent with recruiting missions, end strength ceilings, training base capacities and force modernization and structure compatibilities.

The USARS is designed to enhance combat effectiveness. Its framework provides the opportunity for affiliation, develops loyalty and commitment, fosters an extended sense of belonging, improves unit esprit, and institutionalizes the warfighting ethos. A regiment within the USARS is defined as a single or a group of like-type units designated with a unique regimental color and formed for the purpose of providing an affiliated soldier with an opportunity for long term identification, the potential for recurring assignments, and the basis to perpetuate history, customs and tradition.

Affiliation is the opportunity for a soldier to associate voluntarily with the regiment of his choice for purposes of career development and homebasing. The goal is for 100 percent affiliation of all Army officers, warrant officers, and enlisted personnel. Career-long affiliation is the desired goal but opportunity for change is built into the program.

There were 15 active combat arms regiments in the system as of FY 85. Plans for combat support and combat service support regiments have been developed and are being staffed for implementation. Currently there are plans for an additional 49 regiments being staffed for implementation during FY 86. The USARS is programmed for expansion through FY 92 to a total of approximately 180 regimental colors.

MODERNIZING AND EQUIPPING THE ARMY

We are in the midst of the largest peacetime modernization program in our nation's history. The difference in fighting capability between 1981 and 1985 is remarkable. Systems such as the Abrams tank, Bradley Fighting Vehicle (BFV), Black Hawk helicopter, Pershing II missile, Multiple Launch Rocket System (MLRS) and Stinger air defense missile are fielded now in sizeable numbers. Other key systems such as the Patriot missile system and the Apache attack helicopter are starting fielding and full production.

By fielding the modern equipment in a militarily sound manner, synergism and tactical potential on the battlefield is enhanced. For example, because Abrams/Bradley teams can move one-third faster and the equipment is better than previous equipment, field commanders can implement new tactical concepts and realize the potential of maneuver during operations. Equally important, soldiers who are completing challenging exercises with this equipment are immediately more confident and aggressive. The Army approach is to acquire its new equipment in unit sets to ensure units gain the full potential of the new equipment. If a unit equipped with the Abrams tank has to slow down because of inadequate support equipment our qualitative edge is diminished. The equipment is distributed in unit sets to the units likely to be the first to fight. As a result the Army has accelerated equipment modernization of the Reserve Components (RC) to enable units to train with equipment comparable with that of the Active Components (AC). The RC will receive approximately $2.1 billion worth of equipment in FY 87. Figure 2.8 shows recent trends.

Modernization also encompasses the product improvement of current equipment. For example the M60A3 tank, the Tube launched, Optically tracked, Wire command-link guided (TOW) 2 missile, CH47D, Advanced Helicopter Improvement Program (AHIP), Chaparral, and Hawk are partners on today's battlefield because of product improvements. We are incorporating this strategy through pre-planned block improvements for programs such as the Abrams tank and BFV. This will allow us to maintain technological currency as the threat changes. The use of off-the-shelf, non-developmental items (NDI), compatible with military requirements, is another economical approach we are using to field rapidly needed quality systems.

RESERVE COMPONENT EQUIPMENT DISTRIBUTION QUANTITIES

	ACTUAL			PLANNED		
	FY 83	FY 84	FY 85	FY 86	FY 87	FY 88
M1 ABRAMS	63	60	120	0	0	60
M60A3	130	68	4	283	732	860
BRADLEY	0	0	79	94	158	0
AH1 S	25	21	36	56	109	42
AH64	0	0	0	0	0	18
CHAPARRAL	0	12	24	12	24	30
HMMWV	0	0	0	2895	3960	6208
HEMTT	0	0	0	302	1070	TBD
TRUCK 5T	130	138	883	589	416	312
UH60	6	2	7	18	36	19

Figure 2.8

To assist this rapid fielding of quality systems, the Army Development and Employment Agency (ADEA) received a new mission in 1985. The new mission is to expedite development of materiel systems, related operational concepts, organizational and operational plans, and training developments using emerging technologies in support of motorized, light, heavy, and special operations forces. ADEA will also support Army test bed missions and low intensity conflict requirements. ADEA will focus on short term evaluations and demonstrations of non-developmental items, contractor proposals, and Army laboratory submissions which can offer the potential for cost effective and practical solutions to Army requirements.

From the start of the present modernization program, the conviction that a small, high-quality Army with modern, lethal equipment can defeat an adversary with superior numbers has governed our modernization and equipping strategy. The urgency of completing our modernization program cannot be over emphasized. We cannot lapse again into a period of stagnation while Soviet trends in amassing quantitative numbers of equipment and qualitative upgrades continue unabated. With strong support from the American people, as reflected by their representatives in Congress, we have made great progress in beginning to modernize our combat forces. Continued congressional support is needed to complete this modernization of close-in forces and begin procuring deep operations systems. The opportunity to gain a qualitative edge on the battlefield must be seized.

CLOSE COMBAT

The close combat mission relates to the application of direct combat power with line-of-sight weapons and short range mortars used by infantrymen. The Army is in mid stream of an intensive close combat modernization effort. Both the Abrams tank and BFV have been fielded in substantial numbers. With the fielding of the Apache Attack Helicopter in FY 86, the Army's ability to execute AirLand Battle doctrine is markedly improved.

M1 Series-Abrams Tank. The outstanding performance of the M1 in field exercises has been conclusively demonstrated on four Return of Forces to Germany (REFORGER) exercises in Europe and in the Canadian Army Trophy competition. In all exercises the Abrams achieved a mission capable rate of over 90 percent, while giving extraordinary displays of high speed tactical maneuverability and accurate firepower.

As of 1 January 1986, 32 Abrams battalion equivalents have been fielded. One ARNG battalion has completed fielding and two more will complete fielding in FY 86. A fourth ARNG battalion will complete fielding in FY 87.

The first production delivery of the M1A1 tank in August 1985 began another important phase of the M1 program. Improvements in the current M1A1 version include a 120mm smoothbore gun (German designed, U.S. manufactured), an armor modification and a hybrid Nuclear, Biological, Chemical (NBC) system (both overpressure and ventilated face mask). The M1A1 tank system will give our tank fleet greater lethality and growth potential to meet an advanced threat.

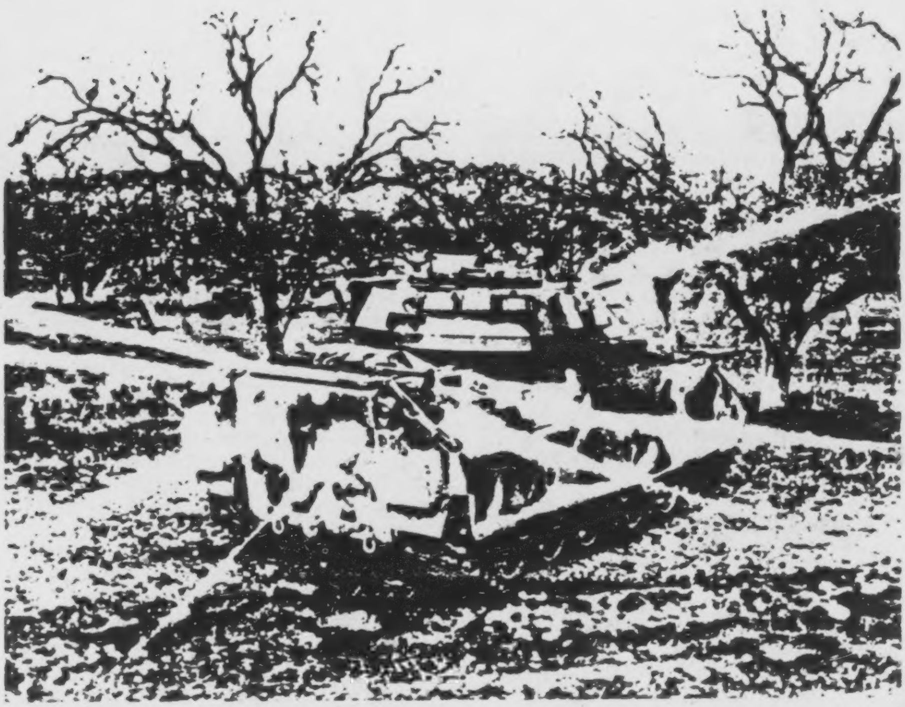
120mm Tank (M1A1) Main Gun Ammunition. Deliveries of the 120mm tank ammunition were scheduled to coincide with the first production roll off of the M1A1 tank equipped with the 120mm main gun. The 120mm munitions are: The M-829, a Kinetic Energy (KE) round, the M-830, a Chemical Energy (CE) round with a shaped charge warhead, and training counterparts for each (the M865 KE trainer and M831 CE trainer).

Bradley Fighting Vehicle. The BFV is an indispensable member of the combined arms team. The fire power from its TOW antitank guided missiles, 25mm stabilized cannon, 7.62mm coaxial machinegun and firing port weapons allows the infantry to implement AirLand Battle doctrine. The BFV's mobility and speed complement the Abrams tank, and when doctrinally employed, the BFV is a critical member in the projection of the close battle forces.

Fielding is proceeding smoothly. As of 1 January 1986, 17 battalion size units have received and fielded the BFV. Two ARNG battalions have been equipped with the BFV.

Over the fielding life cycle of a major weapon system, technology continues to develop cost effective improvements. The first modification increment for the BFV, scheduled for implementation in May 1986, will include the new TOW 2 missile and several interior design modifications.

The BFV has undergone extensive survivability testing. In the initial phase of testing, now completed, a production vehicle was tested against weapons which exceed the vehicle design protection parameters. Results



of this testing showed the BFV to be a sound, survivable vehicle. Technology has developed to the point where a significant improvement in soldier and vehicle survivability may be possible. During 1986, vehicles incorporating these improvements will be tested. If the improvements are cost effective, they will be phased into production expeditiously.

AH-64 Apache. The first Apache battalion is scheduled to be fielded in April 1986. Apache will serve as the Army's primary attack helicopter. Its armament includes the laser-guided Hellfire Missile System for defeating enemy armor and a 30mm Chain Gun and Hydra 70 Rockets which can destroy a wide variety of other targets. A Target Acquisition Designation Sight and Pilot Night Vision Sensor permits the Apache's two-man crew to navigate and attack in darkness and in adverse weather conditions.

AH-1S Cobra. The AH-1S Cobra was developed as a day anti-armor attack helicopter beginning in 1974 when the TOW missile system was mated with the AH1G to produce the Cobra/TOW. During periods of reduced visibility the AH-1S has a limited operational capability, and the TOW missile cannot be employed at night without the use of artificial illumination. To address these shortcomings the C-NITE program will equip 500 AH-1S with a forward looking infrared radar (FLIR) sensor and TOW II guidance electronics. The C-NITE development effort produced and delivered the first prototype modification kit in November 1985. Testing is ongoing with a production decision milestone scheduled for June 1986.

Army Helicopter Improvement Program. The Army Helicopter Improvement Program (AHIP) fields an artillery aerial observer helicopter that incorporates day and night target acquisition and designation capability along with improved communications, navigation, and flight capability. AHIP is able to locate, acquire and designate targets at substantial stand-off ranges for laser guided missiles such as Hellfire, Copperhead and conventional artillery.

Initial operational testing was completed last year and AHIP met or exceeded all technical requirements. Future operational testing will be conducted to verify performance improvements in support of attack helicopter and air cavalry missions. Production Verification Testing began in January 1986 and will continue through June 1986.

Light Helicopter Family. The Army's Light Helicopter Fleet (OH-58, AH-1, and UH-1) is approaching obsolescence and will be unable to meet the Soviet threat of the 1990s. The Army's answer to this situation is a lightweight, highly reliable and easily maintained Light Helicopter Family (LHX). The Army's goal is to achieve a 40 percent operations and support cost reduction over the old light fleet.

There will be two basic LHX configurations: a scout/attack version (SCAT) and a Utility design. The SCAT and Utility versions will have a high degree of standardization, using common dynamic components. The present acquisition strategy is for a competitive development through critical design review. One competitor will be selected to complete LHX development, leading to a competition for production between two or more firms.

Hellfire. Hellfire, the main anti-armor armament of the Apache helicopter, has been adapted for use on the Marine Corps' AH-1T. Hellfire is under consideration as a ground launched weapon. Hellfire has greater lethality, longer standoff range, and shorter time of flight than the TOW missile system.

TOW-2. The TOW missile has been steadily improved to keep pace with the evolving Soviet tank threat. Ongoing product improvements are designed to maintain TOW effectiveness into the 1990s. TOW-2, the latest version, gives the weapon a more lethal 6-inch warhead, greater speed and improved guidance. Since reopening the plant following quality control problems, in January 1985, TOW 2 production has gone smoothly and reliability of missiles has increased.

Advanced Anti-tank Weapon System-Medium. The Advanced Anti-tank Weapon System-Medium (AAWS-M) will replace the Dragon as the Army's medium manportable anti-armor weapons system. It will give the dismounted infantryman a weapon capable of defeating the Soviet advanced armor threat. It is the highest priority development program for our light infantry forces.

The Army approved the entry of AAWS-M into the Demonstration Validation Phase in October 1985. In FY 86 up to four competing "technology-demonstrations" will be conducted. If testing dictates feasibility, a technological approach will be chosen. Through competition, a full scale development contract will be awarded in FY 88.

Light Multi-purpose Weapon System. In September 1985 the Swedish AT4 was selected as a replacement for the 1958 vintage M72 Light Anti-tank Weapon (LAW). Testing, completed in 1985, demonstrated that the AT4 is the best possible short-range, manportable, lightweight anti-armor weapon. A 5-year procurement plan has been approved and is complemented by other service purchases. Initial procurement (3 years) is planned from foreign sources. The feasibility of producing the weapon domestically, probably starting in 1988, will be determined.

Small Arms. Initial issue of the M16A2 rifle to frontline combat troops is expected to be made in the 4th quarter of FY 86. The M16A2 incorporates improvements in sights, barrel, pistol grip, stock and overall combat effectiveness. Its accuracy has been improved and its maximum effective range increased from 460 to 550 meters.

The 9mm Personal Defense Weapon will begin replacing the .45 caliber pistol in March 1987. The Army, as executive agent for the

Armed Services, awarded a 5-year multiyear contract in April 1985 to procure 315,930 handguns. Complying with congressional direction, the Army is studying the feasibility of accelerating the purchase of all service requirements through award of a second multiyear contract or through the execution of options contained in the current contract. The overall goal of the 9mm program is to eliminate proliferation of different handguns and to standardize ammunition with our NATO allies.

Mortars. The Army submitted its Mortar Master Plan to the Congress in July 1985. The plan contains the requirements for the three mortar family, and the acquisition strategy for the 81mm and 120mm mortars and their munitions.

The 120mm mortar will be the battalion mortar for heavy forces. The mortar will be acquired through an NDI acquisition strategy. A competition among foreign competitors will occur in the latter half of FY 86 that should result in a contract to begin fielding in FY 87. There will also be an ammunition development program for the 120mm mortar which will include a full family of ammunition (High Explosive, Smoke, Illuminating, and Training) with production to start in FY 87.

The British manufactured Improved-81mm mortar will be the Army's new medium mortar. This mortar, which consists of American and British components, has improved range, stability, fire control and lethality compared to the present 81mm mortar. The first year of the contract for procurement was signed in May 1985. Fielding will begin in early FY 87. Enhanced capability ammunition for the I-81 mortar system will eventually be produced in the United States.

The 60mm mortar will be retained as the company light mortar. Improved, longer-range ammunition is being developed. As of 1 January 1986, 1,576 60mm, M224 Lightweight Company Mortars have been procured.

CLOSE COMBAT

(NUMBER OF SYSTEMS)

SYSTEM	PROCURED THROUGH FY 85	FY 86 PROC	FY 87 PROC REQUEST	TOT PROC OBJECTIVE
M1 SERIES	4,168	840	840	7,467
BFV	2,865	716	870	6,882
AH-1S COBRA/TOW	1058	0*	0	1087*
AH-64 (APACHE)	309	144	144	675
AHIP	90	36	48	578
HELLFIRE	15,082	6,576	0	48,876
TOW	95,883	12,700	12,000	139,866
AT4	50,000	81,000	136,000	403,000
120MM MORTAR	0	0	138	2,606
81MM MORTAR	441	187	460	1,449
M16A2	93,872	71,990	84,326	530,000
9MM PDW	30,000	25,400	21,219	138,052

*WILL CONVERT 29 AH-1G TO AH-1S CONFIGURATION.

Figure 2.9

FIRE SUPPORT

Fire support covers systems integral to Field Artillery operations. It includes conventional, nuclear, and chemical fire support provided by cannon, rockets and missile systems, as well as supporting target acquisition and communication systems.

Multiple Launch Rocket System. As of 1 January 1986, 15 of 41 MLRS batteries have been fielded. All are on schedule and within costs. MLRS is an all-weather, indirect fire system that can deliver overwhelming firepower against enemy artillery, air defense, and other light materiel and personnel targets, such as assembly areas and command posts. It can fire up to 12 rockets to ranges over 30 kilometers in less than one minute. Growth potential for MLRS exists for a scatterable anti-tank mine warhead, terminal guidance warhead, sense and destroy armor (SADARM) warhead, and binary chemical warhead.

The FY 87 budget will be used to continue to procure rockets. It will also support fielding of four additional MLRS batteries.

MLRS was developed by the United States and will be co-produced by the United States, United Kingdom, Federal Republic of Germany (FRG), France and Italy. The U.S. Navy is also investigating it as a weapon aboard ships.

MLRS Terminal Guidance Warhead. AirLand Battle doctrine dictates a need for an autonomous, terminal homing indirect fire and forget capability to defeat hard, point targets such as armored vehicles before they are committed into the central battle. The concept of a Terminal Guidance Warhead (TGW) for the MLRS envisions the attack of armored targets from above using highly accurate and lethal submunitions dispensed from a MLRS rocket. The TGW for the MLRS will contain six submunitions packaged within the rocket warhead section.

This is the first co-developed weapons system for the Army. Each partner has responsibility to develop and test a portion of the submunition and to ensure system interface. The United States pays 40 percent of the costs while each European partner pays 20 percent.

Army Tactical Missile System and Joint Tactical Missile System. AirLand Battle doctrine dictates a need for an effective deep attack capability to isolate the close battle and disrupt the enemy's ability to deploy follow-on forces. The Army Tactical Missile System (Army TACMS) is a MLRS-launched, deep strike, conventional, semiballistic missile. Joint Tactical Missile System (JTACMS), also MLRS-launched, is a deep strike cruise missile being developed jointly with the Air Force.

Army TACMS and JTACMS capability will be superimposed on the existing MLRS force structure. All MLRS launchers will be capable of firing Army TACMS and JTACMS as well as all MLRS munitions.

Pershing II. Since the initial operational capability for Pershing II (PII) was achieved in the FRG in December 1983, we have continued to field PII systems on schedule. Although some modifications have been made to the system as a result of an accident in January 1985, these modifications have not affected the deployment schedule.

PII is a significantly more accurate missile than its predecessor, Pershing IA and has shown a higher rate of mission readiness.

The FY 86 funding request would have completed procurement of missiles required to support fielding and the planned missile flight test program. However, the FY 86 appropriation results in a decrement of 33 missiles. This precludes the planned assignment of contingency missions to the Pershing II battalion at Fort Sill, Oklahoma. FY 87 funding will provide for procurement of missile flight instrumentation kits.

M109A2/A3 155mm Howitzer. For a portion of the M109A2/3 fleet, the Army approved a product improvement program to extend its useful life to the 21st century. Modifications will provide improved system reliability, availability, and maintainability (RAM) and survivability. It includes an improved recoil and cannon which provides the capability to fire to a maximum range of 30 kilometers, an on-board ballistic computer and gun positioning system, micro-cooling for increased capability of operation in a nuclear, biological and chemical (NBC) environment and improved ballistic protection.

M119 105mm Howitzer. The 105mm M119 Howitzer (L119 British Light Gun) has completed a highly successful evaluation program. The mean time between operational failure is five times that of the M102 Howitzer. The M119 will provide indirect fire support for the five light infantry divisions and other Rapid Deployment Forces. This weapon affords the commander the improved range and performance needed to maintain his maneuverability and quick strike

capability. The program is constructed within a highly innovative and progressive acquisition strategy leading to domestic production. The first year of procurement is scheduled for FY 87.

Advanced Field Artillery Tactical Data System. Advanced Field Artillery Tactical Data System (AFATDS) is the fire support control segment of the Army Command and Control System (ACCS). AFATDS is specifically designed to provide fire support decision information to the force commander, exchange staff information with other command and control systems and provide automated assistance to the functions of fire support planning, command, control, and coordination.

AFATDS will also correct the fire control and distribution deficiencies of the current TACFIRE system with no increase in personnel requirements, and with greatly reduced size, and minimized training burden. The acquisition strategy for AFATDS is first to design, develop and prove the software, then select the hardware to meet system performance and man-machine interface requirements. Fiscal Year 87 funds are required to complete software tests and enter full scale development.

Field Artillery Ammunition Support Vehicle. The Field Artillery Ammunition Support Vehicle (FAASV), a tracked, self-propelled armored ammunition carrier, will begin fielding in Europe in FY 86. This will fill a critical modernization requirement because currently fielded M548 ammo resupply vehicles are unarmored, vulnerable and lacking in survivability.

Fiscal Year 87 procurement supports fielding to forward deployed 155mm artillery units and partial POMCUS fill.

Fire Support Team Vehicle. The Fire Support Team Vehicle (FISTV) provides increased capability to the Fire Support Team in target location accuracy, survivability, mobility, integration of fires and responsiveness. It combines new laser improved artillery observer equipment within the M113 personnel carrier. Because of budget constraints, procurement of the FISTV ends in FY 87.

Copperhead. Copperhead is presently the Army's only artillery delivered indirect fire precision guided projectile capable of destroying specific hard-point, high-value targets such as tanks and command posts. It can be cannon-launched from any 155mm cannon in the inventory out to a range of 16 kilometers. The demonstrated reliability of Copperhead has steadily risen to approximately 92 percent. Copperhead achieved its Initial Operational Capability date in Europe in FY 85 and achieved 10 hits of 12 shots in a recent joint exercise against stationary, moving, and multiple targets. The FY 87 budget request will bring the program to an economic production rate.

Artillery Fired Atomic Projectiles. Artillery Fired Atomic Projectiles (AFAP) have provided a vital part of deterrent and warfighting capability for over 30 years. Modern AFAPs are essential to provide a credible battlefield nuclear capability. A credible AFAP capability forces threat maneuver units to disperse, thereby enhancing the overall effectiveness of conventional defenses.

In FY 87 we will continue plans for producing the W82 155mm AFAP. The Army continues to execute the plan reported to the Congress in accordance with the DOD Authorization Act of 1985. However, the ceiling imposed on the total number of modern nuclear projectiles produced results in fewer modern AFAPs than the Army requirement. This will result in prolonging the retirement of some aging W33 8-inch and W48 155mm AFAPs.

Safety, Security, and Survivability of the U.S. Nonstrategic Nuclear Force. Although serious upgrading of security for U.S. Army nuclear facilities began in 1976, significant improvements have recently been made. The threat by small, manportable weapons has been countered using the Weapons Access Delay System, which places a series of obstacles and delays between the weapons and any threat, and intrusion detection alarm systems, designed to detect attempted penetrations of storage sites and facilities world-wide. Other developments include the use of robotics and artificial intelligence to detect, assess, and respond to attempted penetrations or threats to nuclear weapons; improved security force equipment; and more sophisticated use of control and denial features. Installation of obscuration devices, closed circuit television, detection alarm systems, and improved facilities will strengthen Pershing II security.

For safety, obsolete weapons are being retired, and modern warheads are being fielded with less sensitive high explosives and sophisticated use, control, and denial features.

FIRE SUPPORT

(NUMBER OF SYSTEMS)

SYSTEM	PROCURED THROUGH FY 85	FY 86 PROC	FY 87 PROC REQUEST	TOT PROC OBJECTIVE
M119 (105MM HOW)	0	0	59	542
M109A2/A3 (155MM HOW)	0	0	0	1700
FAASV	344	124	129	973
FISTV	629	200	126	955
MLRS LAUNCHERS	304	44	44	491
COPPERHEAD	16,187	6900	248	31,906

Figure 2.10

For survivability, more needs to be done to protect the capability to employ our nuclear assets no matter what the threat environment. Programs in development include ballistic launcher protection for Pershing II; a secure weapons transport system to store and transport nuclear weapons with minimal exposure; hardening of equipment against electromagnetic pulse (EMP); a secure storage concept of in-ground storage vaults and facilities to prevent or delay access; and improved upload systems for more rapid dispersal.

AIR DEFENSE

Our air defense artillery systems must protect all ground force elements including troop formations, depots, lines of communication, air bases, key command and control facilities, and other vital assets. Comprehensive air defense production for these assets is needed at all ranges and altitudes. Our major shortcoming is the lack of adequate air defense coverage for the Army forward maneuver units.

Forward Area Air Defense. With the decision in August 1985 to terminate the Sgt. York Division Air Defense (DIVAD) program, the Secretary of Defense directed the Army to provide effective solutions to the urgent requirement for air defense of Army divisions. A concept has been developed by the Army as the framework to provide near and long term solutions to counter the growing air threat from both the broad AirLand Battle and the more specific close combat perspective. Based on this concept the Army has assessed current air defense artillery systems and combined arms and U.S. Air Force capabilities to determine deficiencies. Upgrades to current systems, U.S. and foreign alternative systems, and new technologies were examined to determine which system or combination of systems could best solve the deficiencies. Developments in these areas will drive acquisition programs to meet the needs for the joint and combined arms counter air strategy.

The emerging counter air concept has led to the conclusion that the rapidly expanding air threat will require an integrated systems approach with multi-service contribution in a coordinated combined arms effort. The close combat solution will require a combination of weapons and sensors that adequately defeat the array of standoff attack helicopters, fixed wing aircraft, drones, and tactical missiles which can attack the committed combat units of the division. In January 1986 the Army leadership approved a candidate list of four missile systems with the potential to add a gun hybrid for final evaluation and selection in FY 87. They also approved development of a new non-line-of-sight system to meet the standoff helicopter threat and a fully integrated command, control, and intelligence system to support the weapons.

Funding this program in FY 87 is essential to the rapid fielding of an integrated counter air program to solve the critical air defense deficiencies in Army divisions world-wide.

Patriot. Patriot is an advanced surface-to-air guided missile system capable of operating in an electronic countermeasures environment against high speed aircraft at all altitudes.

Successful completion of the Follow On Evaluation (FOE) III led to deployment of the first European Patriot battalion in January 1985. Two U.S. battalions have now deployed to Europe and a third battalion is undergoing training at Fort Bliss, Texas.

A total of 103 Patriot systems will be procured for the United States, 14 of which will be provided to German forces under the terms of the U.S./FRG Air Defense Agreement. The FRG will also purchase an additional 14 Patriot systems, while the Netherlands will purchase 4 systems. Japan has also selected Patriot to modernize its air defense.

Product Improved Vulcan Air Defense. The VULCAN air defense gun is now undergoing major product improvements in its fire control subsystems. The analog ballistic computer will be replaced by a digital microprocessor, a stabilized director-type sight will replace the existing sight, the azimuth and elevation systems will be modified to reduce backlash and built in test equipment will be incorporated.

Because of the termination of the DIVAD Gun program, the Army is reviewing the forward area air defense requirements and will reassess the planned use of the product improved Vulcan.

Stinger. Stinger is the Army's shoulder fired, manportable air defense system. Stinger uses a passive infrared homing seeker to engage targets from all angles, and an electronic means of identification. A follow-on seeker, Stinger-Passive Optical Seeker Technique (POST), improves the capability of the system in certain infrared countermeasures environments. Stinger-POST will initially be fielded in FY 87.

Stinger-Reprogrammable Microprocessor (RMP) further enhances the performance of Stinger in certain infrared countermeasures environments and provides the capability through a replaceable software module to make future changes as the threat evolves. RMP development is being conducted concurrently with POST modifications.

A production contract for 3,216 Stinger-POST missiles was awarded in August 1985, and modified to RMP in October 1985. Missiles delivered in late FY 87 and FY 88 will be RMP configured.

Pedestal Mounted Stinger is a NDI initiative to improve the Stinger capability. Initial production will start in 1987 with deliveries of the first system in FY 88.

Hawk. Hawk is a medium-range air defense guided missile system designed to provide air defense coverage against low to medium altitude air attack. It provides vital asset coverage for air bases, and critical logistics and corps air defense priorities. The thrust of the FY 87 effort is to continue production of product improvement kits which will increase firepower and mobility, while greatly reducing manpower requirements. The ARNG is scheduled to accept at least three Hawk battalions as part of ongoing modernization initiatives.

Chaparral. Chaparral, the Army's short range air defense missile system, can engage all types of aircraft at low altitudes and provides protection for forward deployed divisions and corps and theater rear areas. Chaparral was first fielded in 1969 and will remain in the inventory through the 1990s.

Fielding of the first Chaparral battalion for the ARNG at Roswell, New Mexico was completed in November 1985. The second ARNG battalion will complete fielding in the 1st quarter, FY 87.

AIR DEFENSE

(NUMBER OF SYSTEMS)

SYSTEM	PROCURED THROUGH FY 85	FY 86 PROC	FY 87 PROC REQUEST	TOT PROC OBJECTIVE
PATRIOT FIRE UNITS	58*	12	12	103
STINGER MISSILES	11,650	3,439	4,180	50,664
CHAPARRAL FIRE UNITS	544	64**	0	632

*INCLUDES 3 FIRE UNITS PROCURED WITH NATO AIR BASE AIR DEFENSE FUNDS.

**24 AUTHORIZED, NOT APPROPRIATED, 40 TO BE REPROGRAMMED FROM SGT YORK.

Figure 2.11

COMMAND, CONTROL, AND COMMUNICATIONS

In Command, Control, and Communications the Army is working toward a truly automated battlefield capability. To implement fully AirLand Battle doctrine, the synchronization of forces and their ability to move quickly, frequently, and adroitly on the battlefield is dependent on communications systems. Commanders must have modern communications equipment to determine rapidly the tactical situation and to communicate in an enemy electronic countermeasure environment. The Army continues to develop and test communications and automation systems to operate with like systems of other services and allied nations.

Single Channel Ground and Airborne Radio System. The Single Channel Ground and Airborne Radio System (SINCGARS) family of radios will be lightweight, secure, capable of providing both voice and data transmission and possess Electronic Counter-Counter Measures features. SINCGARS radios are configured in manpack, vehicular, and airborne models. The modular approach permits the replacement of 14 currently fielded radios and reduces the maintenance burden.

Fielding to the 2nd Armored Division at Fort Hood, Texas will begin in FY 88.

Mobile Subscriber Equipment. Mobile Subscriber Equipment (MSE) is a cellular area communications system that will provide military commanders with a survivable, secure, mobile capability to transmit and receive voice, data, and facsimile throughout the battlefield. MSE will provide multiple communications nodes with network features which automatically bypass and re-route communications around damaged or jammed nodes. The MSE system incorporates components of the French Army's RITA mobile communications system, but more than 70 percent of the contract value will be produced in the United States. Acquisition of MSE will complement other new systems, allowing the Army to implement fully the command, control, and communications aspects of its AirLand Battle doctrine.

The MSE program is a milestone in acquisition procedure. MSE used an innovative, competitive NDI acquisition strategy which will avoid an estimated $500 million in research, development, test and evaluation (RDTE) fundings, and a lengthy development period. The production contract, signed in December 1985, will allow the Army to begin fielding this new capability in less than three years and complete converting the Army by 1994. Compared to prior Army plans for tactical battlefield communications, MSE will avoid over $1.5 billion in acquisition costs and more than $8 billion in life cycle costs. Additionally, MSE, along with associated equipment and doctrinal changes, will free over 5,000 soldiers for use elsewhere on the battlefield.

Joint Tactical Communications. Joint Tactical Communications (TRI-TAC) is a joint communications modernization program to provide command and control through the development of high speed digital transmission, switching, terminal and system control equipment. TRI-TAC is targeted for employment at Echelons Above Corps and will provide interface with MSE, other services, defense systems, and allies. In early 1987 the TRI-TAC program will deploy transmission equipment to complement the large capacity circuit and message switches previously fielded.

Military Strategic and Tactical Relay/Single Channel Objective Tactical Terminal. The Military Strategic and Tactical Relay (MILSTAR) is an advanced satellite system which will provide DOD with an extremely survivable and anti-jam strategic and tactical communications capability. The Single Channel Objective Tactical Terminal (SCOTT) is an Army satellite terminal. While all services will use the SCOTT, the Army intends to use it to support command and control requirements from selected brigade elements at division through theater levels.

The SCOTT will be housed in a shelter with a set up time not to exceed 30 minutes. It will provide four voice equivalent channels of secure communications. The SCOTT was approved for engineering development and a contract was awarded in December 1985. Full scale production will begin in FY 89.

The Army Data Distribution System. The Army Data Distribution System (ADDS) is an automatic tactical data distribution system capable of meeting near real-time data communications and position-location reporting requirements, regardless of terrain or weather. The ADDS represents a merging of the Position Location Reporting System (PLRS), a joint Army/Marine program, and the Army/Air Force/Navy Joint Tactical Information Distribution System (JTIDS) program. The ADDS is also known as the PLRS/JTIDS Hybrid.

The Army will equip 18 divisions and 5 corps with the ADDS, starting in late 1988. PLRS equipment, being procured under a 4-year multiyear production contract, will be modified to the ADDS configuration to field the first two Army Divisions. JTIDS is presently in joint development and operational testing at Eglin Air Force Base. A production decision on JTIDS is planned for early 1987.

Maneuver Control System. Maneuver Control System (MCS) provides the maneuver control segment of the Army command and control system. MCS is designed to provide the maneuver commander automated assistance in the collection, storage, review and display of battlefield information. It provides the ability for processing and distributing battle plans, orders, estimates and reports.

MCS is an integrated system of military specification and NDI items. Prototype hardware has been in the field since 1981 and software evolution continues. Production of the military specification MCS hardware is in its third year with fielding scheduled for 4th quarter, FY 86. The NDI contract award will be made in 2nd quarter, FY 86.

Defense Satellite Communications System. The Defense Satellite Communications System (DSCS) is a world-wide long haul satellite communications system designed to meet unique and vital military needs. The Army's responsibilities in this joint program are the development, procurement, maintenance, and training for ground satellite communications terminals, control systems and related communication subsystems for deployment at over 100 DSCS facilities throughout the world.

The FY 87 budget will support key survivability improvements in the DSCS. Procurements will complete the Jam Resistant Secure Communications System, support modernization, automation and increased system survivability. Work will be completed on eight DSCS control facilities to satisfy DSCS operations control requirements.

Joint Surveillance and Target Attack Radar System. The Joint Surveillance Target Attack Radar System (Joint STARS) is a battle management and target attack control system which detects, tracks, classifies and assists in attacking both moving and stationary targets beyond the Forward Line of Own Troops (FLOT). It allows the commander to see and strike deep into the enemy's rear, a critical need to execute successfully AirLand Battle doctrine. The Air Force is responsible for the Prime Mission Equipment (platform, radar and data link) and the Army is responsible for the Ground Station Modules (GSM).

The Joint STARS aircraft will orbit behind the FLOT, while the radar performs multimode functions to acquire targets. Target radar data will be transmitted to Air Force command, control, communications and intelligence (C3I) nodes and to Army GSMs located in the divisions and corps. The Army will process data at the GSM and disseminate the battlefield intelligence and targeting information to its users over the All Source Analysis System (ASAS) and TACFIRE/AFATDS nets, respectively.

Joint Tactical Fusion. The Joint Tactical Fusion program is developing the ASAS for the Army and Enemy Situation Correlation Element (ENSCE) for the Air Force. ASAS/ENSCE is an automated system which will analyze, fuze, and report intelligence information from tactical and strategic sensor and other intelligence sources. The view of the battlefield it provides commanders will guide the prosecution of the AirLand Battle and the deep attack. Hardware and software contracts were let and system design reviews were conducted during FY 85. Development testing and operational testing will begin for two of the four system modules in FY 86, and for the remaining system modules in FY 87. Procurement of modules tested in FY 86 will begin in FY 87, providing a limited fusion capability to the field.

Unmanned Aerial Vehicle. The Army is developing a low intensity/high intensity mix of systems as a part of a family of Unmanned Aerial Vehicles (UAV). The Army intends to execute an NDI procurement program in FY 86 in response to its need for a mix of systems.

Aquila, one member of the family, is a small (13-foot wingspan) propeller-driven, pilotless aircraft designed to fly in hostile territory to locate targets, allow adjustments of artillery fire from remote distances, and laser designate targets for destruction by laser-seeking artillery or missiles. It can also perform reconnaissance, damage assessment and other functions. Development of a FLIR device began in FY 84 to provide a night/adverse weather capability.

Production of the Aquila is expected to begin in FY 87. The FY 87 budget continues Aquila related RDTE, begins procurement of the Aquila system, and allows evaluation of other off-the-shelf systems to meet near term intelligence, and electronic warfare requirements.

COMMAND, CONTROL, AND COMMUNICATIONS

(NUMBER OF SYSTEMS)

SYSTEM	PROCURED THROUGH FY 85	FY 86 PROC	FY 87 PROC REQUEST	TOT PROC OBJECTIVE
SINCGARS	12,100	400	16,000	277,703
ADDS (SETS)	0	3	8	120
MSE				
(DIV BN SETS)	0	1	6	28
(CORPS BN SETS)	0	0	5	20
JSTARS (GROUND STATIONS)	0	0	6	72
UAV	0	0	8	376

Figure 2.12

COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

Modern support equipment provides operational assistance to the combat arms in the execution of AirLand Battle doctrine. Tactical transportation needs have undergone dynamic changes. Both in the air and on the ground, our mobility has greatly improved.

Tactical Wheeled Vehicles. The High Mobility Multipurpose Wheeled Vehicle (HMMWV) and Commerical Utility Cargo Vehicle are complementary light payload vehicles which are replacing the current fleet of M880s, Gama Goats, Mules and jeeps. The FY 87 budget supports the fifth multiyear production of over 12,800 HMMWV.

10-Ton Truck Fleet. The Heavy Expanded Mobility Tactical Truck (HEMTT) will continue to be procured from the current producer. The heavy-load fleet follow-on program, based on a palletized loading system concept, will begin testing of competitive prototypes in FY 87.

UH-60 Black Hawk. Black Hawk is a twin-engine, single-rotor utility helicopter that can carry up to 14 combat-equipped troops or an equal cargo load into all intensities of conflict and in all expected geographical environments.

Black Hawk has been successfully employed in a variety of missions under demanding tactical conditions, including the Team Spirit exercise in Korea and the REFORGER exercise in Germany. Black Hawk was also used extensively in Grenada.

As of 1 January 1986, 701 UH-60 Black Hawk aircraft have been delivered to the Army. The Black Hawk airframe is being procured under a second multiyear contract (FY 85), which has significantly stabilized the production base and avoided substantial potential costs.

A FY 86-88 T-700 series engine multiyear contract will be awarded in early 1986. The T-700 FY 86-88 multiyear contract will provide T-700 series engines for Army, Navy, and Air Force aircraft.

CH-47D. The CH-47 medium lift helicopter is being modernized to the D model configuration to extend the service life beyond the year 2000, to improve safety and RAM, and to improve capability to meet a new requirement—the aerial movement of newer tactical equipment within the battle area.

The CH-47D configuration is fixed; the program is not test dependent and there are no technical problems. All contracts have been executed within cost and on schedule.

M9 Armored Combat Earthmover. The M9 Armored Combat Earthmover (ACE) is a highly mobile, armored, earthmoving vehicle. It meets the combined arms requirement for an engineer vehicle that can dig, doze, haul and scrape and offers the operator protection from small arms fire, artillery fragmentation, and NBC effects. The ACE is amphibious and possesses a communications capability. Its responsiveness and survivability enable the ACE to prepare fighting positions, create obstacles, and enhance friendly force maneuver on the forward battlefield.

The ACE will be fielded to the heavy and light forces. In March 1986 the 7th Infantry Division (Light) will be the first unit equipped.

Other Support Equipment. The procurement of combat support equipment to cover new requirements and replace obsolete equipment must keep pace with the needs of the modern battlefield. With emphasis on water purification units, mobile electric power, bridging, mine and countermine items, and chemical and maintenance equipment continuing efforts to modernize all aspects of combat service support equipment are being made.

Tactical Army Combat Service Support Computer System. Tactical Army Combat Service Support Computer System (TACCS) is a transportable microcomputer system using rugged off-the-shelf components. The FY 87 request continues production and supports the fielding of TACCS to seven divisions and numerous nondivisional units.

Improved Clothing and Individual Equipment. Research and development projects to upgrade and improve soldiers' clothing and individual equipment continue. These projects are directed at development of significant improvements in NBC, laser/ballistic, and climatic extreme clothing and equipment to protect, sustain and increase the survivability of the soldier on the modern battlefield.

Organizational clothing and individual equipment (OCIE) has been inadequately funded for a number of years while requirements have continued to grow. Critical items include personnel armor system ground troop (PASGT) helmet and vest, combat vehicle crewman (CVC) uniform system, extended cold weather clothing system and the desert uniform. The OCIE modernization program is fully integrated with the projected activation of the new light divisions. To enhance safety, the Army is funding the fighting force clothing needs; issuing PASGT helmets to high priority units and taking action to make the CVC uniform system mandatory for training. The new systems will greatly improve our support for the individual soldier by lightening the load and providing state-of-the-art, weather resistant, camouflage and ballistic protection.

COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

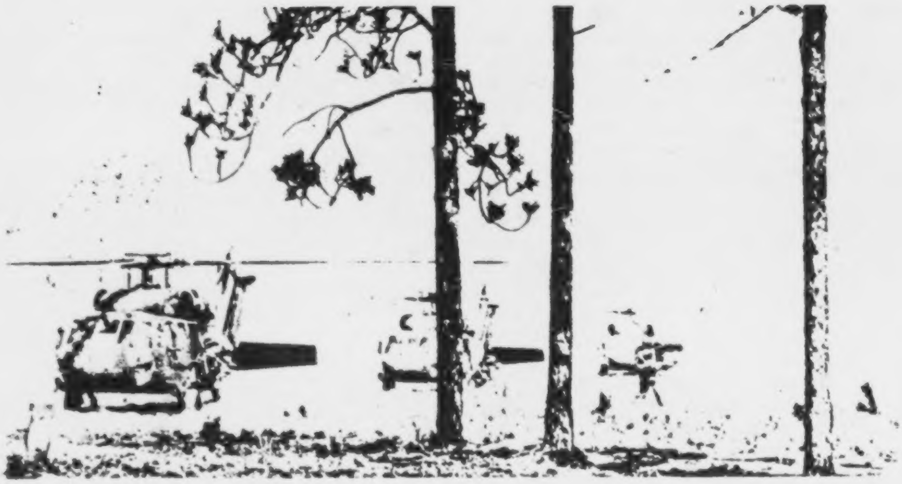
(NUMBER OF SYSTEMS)

SYSTEM	PROCURED THROUGH FY 85	FY 86 PROC	FY 87 PROC REQUEST	TOT PROC OBJECTIVE
HMMWV	18,464	12,132	12,842	101,633
10 TON	6,202	861	1,823	18,013
UH-60	689	78	78	1107
CH-47	136	48	48	436
M9 (ACE)	15	22	21	580

Figure 2.13

NUCLEAR, BIOLOGICAL, AND CHEMICAL

Chemical Warfare Deterrence and Binary Munitions. As the threat of chemical warfare increases around the world, we have provided more protection, decontamination, and monitoring equipment. In FY 86 the Army initiated procurement of the United Kingdom Chemical Agent Monitor. In FY 86 we are procuring a simplified collective protection shelter, an improved protective mask, an individual equipment decontamination kit, and a mobile smoke generator system. In FY 87 we will begin procurement of a new automatic detector with greater capability. Major payoffs from the RDTE program are just beginning and more will be realized over the next few years. However, serious shortages remain. Moreover, defense alone is not enough. The Army's



chemical defense readiness has improved, but our ability to deter chemical warfare is still weak. Even improved chemical defense does not compensate for the 30 to 50 percent loss of operating capability caused by use of protective equipment. Our deterrent capability is not adequate and will remain inadequate until we field a modern chemical retaliatory capability.

The present stockpile has become obsolete for use on the modern battlefield and does not meet the requirements of our field commanders. It is potentially dangerous to maintain and use because of its deadly chemicals. We have made the difficult but responsible commitment to rid ourselves of this old stockpile and, with the help of Congress, replace it with a safer, more effective, and smaller binary munition stockpile. Such a commitment to modernization is key to restoring a meaningful chemical warfare deterrent and progress in efforts to ban chemical weapons altogether. Toward this end, the Army has requested FY 87 funds to continue to build binary production base facilities and produce binary munitions.

Modernization of Dugway Proving Ground. The Army is the lead service for chemical warfare and chemical-biological defense (CW/CBD) development and testing for all DOD components. Dugway Proving Ground, Utah, a major range and test facility, has the mission to test CW/CBD, and smoke and obscurant items to ensure they perform adequately. For many years Dugway was maintained at only a minimum operational capability and did not keep up with the rapid technological changes of the past decade. Without modern and expanded capabilities Dugway cannot meet the projected workload from the increased CW/CBD research and development programs.

Fiscal Year 87 will be the second year of full modernization to restore a test capability to meet the increased test workload. A new materiel test facility and continuation of family housing improvements are included in FY 87. The modernization of facilities is paced with the projected test workload. The modernization will upgrade the technological characteristics and capability of the instrumentation base for measurement of smoke and obscurants and for use in defense test chambers. Laboratory test facilities will be modernized and communications will continue to be upgraded.

Medical Defense Against Agents of Biological Origin. The Army has tri-service responsibility for research on medical defense against biological warfare. A vigorous research program is necessary because of indications that the Soviets maintain an active research and development effort in this area. The anthrax accident in Sverdlovsk, the use of yellow rain by Soviet surrogates in Southeast and Southwest Asia, and recent reports that the Soviets have greatly expanded their Agents of Biological Origin (ABO) program are evidence of their capability. Added to this threat is the long lead time required to develop prophylactic and therapeutic measures against ABOs even on a generic basis.

The FY 86 budget includes an expanded effort to develop generic protection against ABOs. Work continues toward development of several vaccines, antidotes, and a rapid identification diagnostic system against potential ABOs. The FY 87 request provides funds to consider the feasibility for expanding the industrial base of the production of potential vaccines. Vaccines for Tularemia, Rift Valley Fever, and Venezuelan Equine Encephalitis will be available in FY 86.

STRATEGIC SYSTEMS

Strategic Defense Command. The U.S. Army Strategic Defense Command, the Army component of the President's Strategic Defense Initiative (SDI), has successfully managed a research program in excess of $800 million in the five functional areas of ballistic missile defense: surveillance, acquisition, tracking and kill assessment; kinetic energy weapons; directed energy weapons; systems analysis battle management; and survivability, lethality, and key technologies. This research is necessary to demonstrate technologies leading to a multi-tiered strategic defense system. DOD manages the President's program through the SDI Organization which, in turn, coordinates the research efforts of the services and other government agencies, and the national laboratories.

The FY 87 program will continue to research technologies in the areas of surveillance and sensors, directed energy weapons, and battle management with potential application to strategic defense systems. This work offers the Army an opportunity to make major contributions to strategic defense through application of its unique knowledge in these areas. This research effort will facilitate integration of the ballistic missile defense technology programs into the Army's long range plans.

TRAINING THE ARMY

The imperative for quality training has never been more challenging. Within the framework of a revitalized combined arms concept, new tactics place higher emphasis on initiative, flexibility and synchronization. To transform textbook theory into wartime practice requires well-trained units. New weapons systems are more mobile and lethal making possible the ongoing doctrinal revolution. To transform design potential into battlefield capability requires well-trained individuals and crews. To transform these highly motivated volunteers into combat ready soldiers, crews and units require well-trained leaders.

Army training focuses on the attainment, enhancement and sustainment of individual and collective skills contributing to the application of raw combat power and its lethal multipliers on the battlefield. Even though today's training is better than ever, the challenge for the future, given the reality of a constrained budgetary environment, is to maintain as high a degree of training readiness as possible, with reduced training resources. Momentum must not be lost.

Key to this effort will be the deliberate application of emerging training technology. Current programs and projected initiatives are being crafted into a series of integrated training strategies providing an optimum mix of air and ground maneuver, live fire, and surrogate training devices. A forecast measure of training readiness will link quantifiably these strategies and the resources required to support them.

The professional development of our officers and noncommissioned officers at all echelons is instrumental to training readiness. Strong leader development is an imperative. An overemphasis on the machinery and technology of war can overshadow the human factor. Quality soldiers provided quality leadership will yield quality results in training or in combat. A reemphasis on leadership is taking place in both the school and unit. It is a low cost investment with high yield benefits.

Unit training will concentrate on mission essential tasks at battalion and below, use of simulation-supported command post exercises where feasible, and employment of innovative and non-traditional means of maintaining combat proficiency within operating tempo (OPTEMPO) constraints. The flying hour program will combine pilot and crew individual training requirements with unit mission and combined arms training to the greatest extent possible. Execution will be closely managed. RC training and training support will be tailored to make the most effective and productive use of extremely limited training time, home station facilities, and maneuver areas.

Training in schools will continue to develop and produce highly qualified soldiers and leaders possessing tactical and technical proficiency in the combat, combat support and combat service support skills. Managerial emphasis will strive toward technology-based increases in training efficiency and effectiveness while providing a stable training base in support of programmed loads.

Training resources at all echelons must be stringently managed. The ultimate goal must continue to be the attainment of a higher degree of individual, crew and unit training proficiency at equal or lower cost. This must be accomplished despite substantially higher ammunition, operating and support costs associated with much of the modern equipment. The challenge is significant.

Schools. The Army is in the midst of redesigning its formal school structure to improve the progressive development of warfighting and technical skills necessary for today's environment. In general, school curriculums are structured around a common core of warfighting skills appropriate to the grade of the student. This common core is supplemented with professional study of topics such as the art of war and specialized instruction to develop tactical and technical competence for future assignments. Recent innovations include:

- Ranger 3000
- Restructure of the Noncommissioned Officer Education System
- Combined Arms Services Staff School (CAS3)

Ranger 3000. The Ranger course is a mix of dynamic instruction and challenging experience. Instruction sets the stage for experiential learning of tactics, combat techniques, night training, leadership skills, physical endurance, and geographical indoctrination.

Recent initiatives increase the required Ranger positions in the Army from less than 1,000 to a projected total of almost 7,000 by FY 87. These needs translate to an annual training requirement of over 3,000 soldiers. By FY 87, the Army will increase the available training opportunities for Rangers from 2,300 to over 3,000 slots annually.

Restructure of the Noncommissioned Officer Education System. The Noncommissioned Officer Education System (NCOES) is being restructured to provide sergeants in combat support and combat service support branches with the same type of leader development oriented professional training afforded their counterparts in combat branches.

With the realignment of NCOES, noncommissioned officer (NCO) training follows a common track. Training for NCOs focuses initially on leadership in the Primary Leadership Development Course. The next step is the Basic Noncommissioned Officer Course (BNCOC) that contains standard leader training required throughout the Army and skill training that addresses directly the requirements of soldiers serving in each branch of the Army. The principal purpose of BNCOC is to produce highly trained and motivated NCO section or squad leaders. The increased emphasis on soldier skills and common understanding of tasks taught in these NCOES courses serves to bond the NCOs of all branches. The NCO will continue professional training in the Advanced Noncommissioned Officers Course. The capstone of the NCOES is the highly selective and challenging Sergeants Major Course taught at the U.S. Army Sergeants Major Academy.

Combined Arms and Services Staff School. An intense 9-week course, the CAS3 is designed to provide captains with the professional skills necessary to serve successfully as a staff officer at battalion, brigade and division level. Studies of officer professional education and training recognized a critical need for training in unit staff skills. In FY 86, 2,400 captains will complete CAS3. In FY 87, the training load will increase to approximately 4,500 students per year, providing all captains with the opportunity to gain this highly effective training experience.

Operating Tempo. OPTEMPOs are established for intensively-managed systems and reflect the required rate of use to achieve projected annual training. The rates are expressed in terms of miles per year, hours per year, or other appropriate units of measure per system.

OPTEMPO is a newly instituted management process that will assist in quantifying the relationship between resource levels and readiness. Budget constraints have forced an overall reduction in OPTEMPOs since FY 85. While the rates remain adequate to sustain readiness levels, further reductions may impact negatively on readiness.

Training Ammunition. The Standards in Training Commission (STRAC) established uniform weapons training standards and supporting resources for the Army. The development of STRAC has already resulted in reductions in forecasted ammunition needs. The standards and strategies in STRAC provide the Army with a valid rationale for training ammunition requirements, improving the means by which related dollars are justified. The FY 86 ammunition budget protects training readiness and reflects full caliber ammunition cost savings through the use of devices and simulators. However, in an era of declining resources, requested funding for FY 87 and beyond is well below STRAC requirements.

Device Based Training. The Army has developed and fielded technology-based training devices, simulators, and simulations which are revolutionizing the way soldiers and units train. These tools permit commanders to sustain higher levels of unit proficiency at less cost and provide training feedback previously not available. These devices are increasingly integrated into initial entry and unit sustainment training programs, with special emphasis on providing simulations to the RC.

Many of the recent investments in training technology do not provide an absolute tradeoff in OPTEMPO, but serve essentially to improve training effectiveness and to compensate for increased operating costs of modernized systems. For instance, the Multiple Integrated Laser Engagement System (MILES) and the instrumentation at the National Training Center allow objective evaluation and permit critique of individual and collective tasks—areas of increasing importance and technical complexity.

OPTEMPO was decremented from a level of 1,000 miles per tank per year in FY 84 and earlier years to approximately 850 miles in FY 85 and beyond. This reduction is based on a number of factors—investment in simulations, budget constraints, refinements of modeling techniques, and other changes. Near-term offsets to support investment in simulators have concentrated more on procurement accounts such as ammunition than on operating and support costs. However, simulators that offer potential as OPTEMPO surrogates are now beginning to be fielded. These include: Unit Conduct of Fire Trainer (UCOFT), and Army Training Battle Simulation System (ARTBASS).

The UCOFT, a computer driven visual scene simulator for gunnery skill training, provides the best example of this situation. Two years after UCOFT is fielded to each MI tank battalion, each tank is decremented 34 main-gun rounds. The cost differential associated with this reduction is shown below.

UCOFT COST AVOIDANCE

TYPE OF ROUND	ROUNDS REQUIRED/ TANK/YEAR	COST/ ROUND*	# TANKS/ BATTALION	COST AVOIDANCE PER BATTALION PER YEAR
105MM				
TP T	14	$132	58	$107,184
DS TP	20	$168	58	$194,880
				$302,064
120MM				
TP T	14	$1,278	58	$1,037,736
TPCSDS T	20	$854	58	$990,640
				$2,028,376

*FY 86 PROJECTED COSTS. AS MORE 120MM ROUNDS ARE PRODUCED PRODUCTION WILL BECOME MORE ECONOMICAL AND UNIT COSTS WILL DECLINE.

Figure 2.14

Further, annual cost avoidance associated with UCOFT fuel and maintenance costs is estimated at $320 thousand per battalion. Most important, however, these simulators provide soldiers training opportunities transcending the constraints associated with full service firing.

The family of flight simulators is also illustrative of the cost avoidance gained by the intelligent integration of this technology in aviation training.

AVIATION SIMULATORS COST AVOIDANCE

DEVICE	SIMULATOR COST/HOUR	AIRCRAFT COST/HOUR*	RATIO OF SIMULATOR COST/HOUR TO AIRCRAFT COST/HOUR
UH-1	40.00	491.00	8.1%
UH-60	117.00	1520.00	7.7%
AH-64	275.00	3714.00	7.4%
AH-1	407.00	1240.00	32.8%

*FY86 RATES

Figure 2.15

Other high payoff training devices are the Remote Target System, which is the target mechanism component of the Army's Range Modernization Program; the Air Ground Engagement System, MILES for aircraft and air defense weapon systems; and MILES for M1/M2/M3. Several emerging training simulators appear to have tremendous potential for more efficiently enhancing unit proficiency. As an example, the Tank Weapons Gunnery Simulation System is a precision laser device used with tanks and Bradley Fighting Vehicles. This device will allow tankers and infantrymen to practice gunnery by firing a precision laser beam at targets rather than expending live ammunition.

MILES has been a success in training tactics. While MILES has provided unparalleled opportunities for realistic, two-sided, tactical training world-wide, true combined arms tactical engagement training is being sought. Efforts to incorporate the simulation of field artillery indirect fire, mines, and NBC area weapons effects into MILES exercises will improve tactical engagement training.

Simulation Networking (SIMNET) is strongly supported by the Army in an effort to make up training shortfalls caused by reductions in the OPTEMPO of maneuver forces. SIMNET will interconnect large numbers (up to battalions) of low cost combat vehicle simulators in two-sided, free play tactical engagement simulation.

Battle simulations provide an efficient method of training soldiers, unit commanders, and staffs. However, simulations currently available to commanders are either manually driven or very labor intensive automated systems. There are no standard, computer-driven simulations at corps or division level. Brigade through crew simulations are inefficient and often do not operate in real time. However, improvements in battle simulation are underway. ARTBASS is a computer-driven simulation which provides a highly realistic environment to train battalion commanders and their staffs in the control and coordination of combined arms operations. ARTBASS fielding has begun.

The FY 87 budget reflects the Army's continued commitment to exploit the capabilities of training devices and simulators to provide realistic training with the potential to achieve long term economies by funding efforts to simulate indirect fire; expanding MILES use to RC units and to more types of weapon systems; continuing production of the Conduct of Fire Trainer and Flight Simulators; and funding efforts to substitute training devices and simulators for live fire.

Our major thrust in the development of new training devices is to develop equipment that allows a high transfer of knowledge and experience from the training situation to a combat situation.

Automated Training Information. An automated training management system responsive to the planning and resource needs of units from battalion through Department of the Army is under development. ADEA has continued development and definition of the Integrated Training Management System (ITMS). Assessment, conceptual definition, and functional description of the system have been completed. Also, approval has been granted to initiate a competitive contract action for the prototype, test bed validation of ITMS in the 9th Infantry Division (Mtz).

Training Facilities. To meet the complex training challenges for both AC and RC units, programs are underway to develop efficient and productive facilities. Begun in 1982, the Army Range Modernization Program has matured into an effective management system to field range systems in support of modernized weapons and training requirements. The Multipurpose Range Complex is the keystone facility which provides a challenging gunnery experience for tank and mechanized infantry units up to platoon level. Eleven of the 14 planned ranges will be under construction or completed by FY 87. The Military Operations on Urbanized Terrain (MOUT) facilities provide individual and collective training for this difficult contingency. Twelve MOUT complexes are planned; two additional facilities will be completed or under construction by FY 87. The Army has made a significant investment in range construction.

($ in millions):

FY 84	FY 85	FY 86	FY 87
107	76	112	63

Three important training facility programs for the RC are: A Regional Training Center (RTC), Regional Maintenance Training Site (RMTS), and Regional Training Site-Medical (RTS-MED). The RTC, planned for Fort Dix, New Jersey, will be a test-bed facility for developing combat arms, combat support, and combat service support soldier and leader skills through a device-based training strategy. The RMTSs will be located in areas with a high density of non-divisional maintenance units. Pilot RMTSs are scheduled for Camp Shelby, Mississippi and Fort Bragg, North Carolina during FY 86. Twenty-one RMTSs will become operational between FY 86 and FY 90. The RMTS will be the keystone in transition and sustainment training for the RC non-divisional light and heavy equipment maintenance personnel on the repair of current and force modernization equipment. For many units, the RMTS will provide the only opportunity they will have to train on modern equipment before deployment to the theater of operations. The RTS-MED will provide ARNG medical units with complete sets of deployable medical systems hospital equipment for training.

National Training Center. The National Training Center (NTC) at Fort Irwin, California, is the Army's key facility for training mechanized and armor task forces. In FY 85, the NTC reached its sustainment level of 28 battalion rotations per year. Army National Guard roundout battalions also receive the benefit of the NTC experience. Five units trained alongside their active partners in FY 85, two more are scheduled in FY 86, and two are projected for FY 87. Improved unit performance at NTC manifests the significant positive impact of the NTC on Army training. The implementation of the NTC Five Year Plan in FY 87 will bring some important improvements. The brigade headquarters and supporting elements will be more fully integrated into the exercise and evaluation. Air Force tactical air participation, already extensive, will be integrated into the instrumentation system.

Another important initiative is the inclusion of four light infantry battalions each year. This program prepares those units for high intensity combat and teaches the heavy and light forces to work together on the battlefield.

Reserve Component Training. Initiatives are underway to improve training of the RC to prepare units better to execute their wartime mission. The Key Personnel Upgrade Program (KPUP) develops key personnel within ARNG units through direct association during additional training periods with a counterpart AC officer or NCO. The program provides ARNG officers and NCOs practical experience in a tactical environment. The USAR operates a readiness training program for skill qualification. This program places members of the IRR on periods of voluntary active duty with an AC unit in positions appropriate for their grades and mobilization specialties.

The Capstone Program orients RC commanders to their wartime organization and provides the opportunity to train with active counterparts. The Overseas Deployment Training (ODT) Program enables high priority RC units to train in their contingency areas with their wartime gaining command. The ODT program has increased from 26 units and cells in 1976, the first year of the program, to over 1,900 units and cells for FY 85. Selected units trained up to 26 days in Joint Chiefs of Staff (JCS) exercises working alongside their AC counterparts. Projections indicate that nearly 2,000 units and cells will participate in FY 86, including the 32nd Infantry Brigade, Wisconsin ARNG which participated in REFORGER FY 86. During FY 87, 1,280 units and cells have been approved. As long as JCS exercise funds are provided, funding will support the current level of RC participation in ODT.

The Army Exercise Program. The overall Army exercise program includes both unilateral and joint and combined exercises. Unilateral exercises are generally sponsored and conducted at corps level and below. Major joint and combined exercises are coordinated and sponsored by the JCS or one of the unified commands under the auspices of the JCS Exercise Program. The levels of Army commitment of troops and support to the exercise schedule is governed by availability of forces to meet troop list requests, the sufficiency of support funds and the relative value of the activity as a training vehicle or instrument of national policy.

Deployment exercises provide invaluable training to CONUS-based units. Troops and equipment are deployed and exercised in Europe, Southwest Asia, Central America, Korea and the Pacific. In FY 87, the Army will participate in over 45 JCS directed or coordinated exercises. However, sharp reductions in joint exercise support funds were made for all commands except U.S. Southern Command. The total exercise program for FY 87 will be funded at 15 percent lower than the FY 85 program and 7 percent lower than the FY 86 program. Participation levels for FY 87 exercises have been adjusted to meet the lower funding levels. The major impact is the reduced level of Forces Command (FORSCOM) support.

Joint training and interoperability objectives have been established for each exercise to ensure that forces have sufficient time to develop supporting objectives and conduct preparatory training. RC participation for specific exercises is identified at least two years prior to execution.

- REFORGER 87. The largest group of CONUS-based forces (28,000) ever to participate in REFORGER will be deployed, draw POMCUS, and conduct a field training exercise. The REFORGER series demonstrates rapid reinforcement of NATO and U.S. warfighting capabilities, improves NATO interoperability, and exercises general defense plans. In FY 87, RC involvement will be extensive since the majority of all exercise combat service support will be provided by RC units.

- Team Spirit 87. This exercise improves the combat readiness of the Republic of Korea and U.S. forces through joint and combined training that includes strategic and tactical deployments and the reception and use of U.S.-based augmentation. Augmentation forces will include brigade size forces from the 25th Infantry Division and the 7th Infantry Division (Light), special operations forces and a considerable number of RC units with combat service support missions.

- Kindle Liberty 87, Cabanas 87, Blazing Trails 87, and Ahuas Tara 87. These joint and combined exercises will deploy CONUS-based active and reserve forces to Central America under the sponsorship of U.S. Southern Command. Deploying forces will be integrated with forward deployed U.S. and host nation forces and will conduct field training exercises that emphasize counterinsurgency operations. These exercises improve the training of both U.S. and friendly forces while maintaining a U.S. presence in the region and providing a means to deter aggression.

- Bright Star 87. This is a large scale U.S. Central Command exercise that will deploy CONUS-based forces to various countries of that command's area of operations. The exercise will emphasize rapid deployment, mobility, host nation agreements, combat readiness and extensive integration of RC units.

DEPLOYING AND MOBILIZING THE ARMY

The Army mobilizes and prepares for war in concert with the other services, by developing a capability to expand and deploy the required personnel, supplies and equipment needed to respond to any crisis. Planning for this capability involves continued refinement of policies and procedures to ensure adequate manpower and logistics arrive in-theater at the required place and the proper time. The ability to mobilize rapidly and effectively is an important element of deterrence and is critical to successful warfighting. Planning for mobilization must complement operational planning and include military mobilization, industrial responsiveness and crisis management. Mobilization must be integrated with all DOD planning and exercise activities.

Recent developments include a system to improve the Army's rail capability to support mobilization and deployment; a program to ensure Military Occupational Specialty (MOS) training for designated Individual Ready Reservists; testing of Rapid Erectable Light Mobilization Structures to offset increased requirements for facilities during mobilization; plans for establishing and operating the minimum forward stationing forces in a shortfall area to plan, coordinate, receive and sustain reinforcing divisions and establish community support; and development and testing of new logistics doctrine and procedures for Army units, the sustaining base, and battlefield support systems.

Mobilizing the total force will continue to be of highest priority. In FY 78 the ARNG began an exercise program, complementary to the JCS exercise program, to evaluate mobilization and deployment preparedness of high priority units. In FY 85 nearly 600 exercises were conducted involving almost 1,400 ARNG units. Beginning in FY 87 the USAR will begin similar exercises of early deploying units.

Strategic Mobility. The ability to meet time sensitive force and sustaining supply delivery requirements is critical to the Army's global deployment mission. We remain vitally concerned about the adequacy of airlift and sealift resources and continue to support fully the Air Force and Navy in their efforts to improve total strategic mobility capability. Improvements in both of these areas are being made. We have formalized our joint commitments to work together to define the requirements and to identify the programs which will most efficiently meet those requirements. These commitments are embodied in Memorandums of Agreement we have entered into with the Air Force and the Navy. Despite these coordinated efforts, progress in resolving strategic lift capability shortfalls is slow, and the solutions are expensive. Our efforts are further complicated by the continuing decline in the capability of the civil sector, primarily the U.S. Merchant Marine, to support our wartime needs.

Adequate strategic airlift is most critical in the early days of a war or crisis. Figure 2.16 illustrates projected strategic airlift program capabilities through FY 91, expressed in millions of ton miles per day (MTM/D).

The FY 91 program will result in approximately 48 MTM/D of capability against a recognized long term requirement of 66 MTM/D. The resulting shortfall of approximately 18 MTM/D will be reduced significantly by fielding the C-17 Airlifter which is scheduled for initial operating capability in FY 92. In addition to reducing the overall strategic airlift shortfall, this versatile aircraft will provide essential outsize airlift capability, reduce the intratheater airlift shortfall, provide a needed replacement for the C-141, and augment the C-130 fleet. In the near term, airlift capability is being improved by "rewinging" the C-5A fleet, acquiring 48 C-5Bs and 44 additional KC-10s, improving wartime aircraft utilization rates, extending the service life of existing aircraft, and limited enhancement of the capabilities of the Civil Reserve Air Fleet.

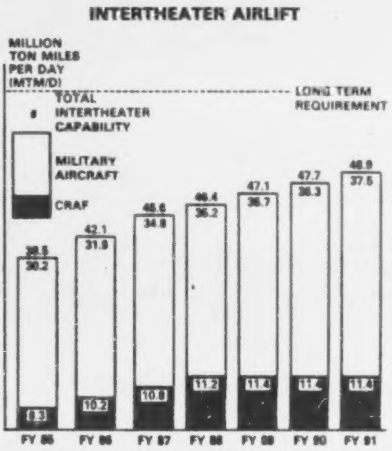


Figure 2.16

Strategic sealift is critical to the deployment of Army forces and sustaining resupply. The continuing decline of the Merchant Marine fleet, and the industry trend toward containerization and away from more militarily useful breakbulk shipping, requires an innovative look at the scope and direction of strategic sealift programs. Figure 2.17 portrays the decline in the number and capacity of militarily useful general cargo ship capacity in the U.S. Merchant Marine from 1970 to 1990. The importance of an active program to respond to this decline cannot be overstated. The Navy, with our support, is meeting this challenge through a combination of programmed increases to the U.S. Ready Reserve Force and enhancement programs to allow container ships to be modified to support unit equipment movement requirements.

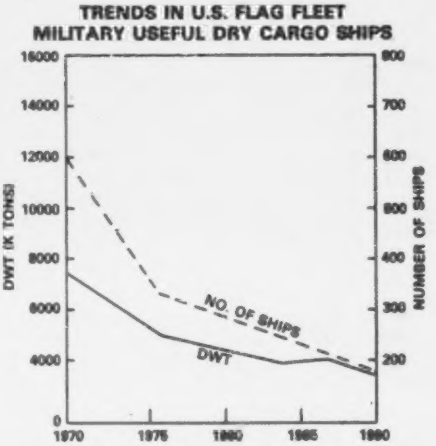


Figure 2.17

Figure 2.18 illustrates the impact these programs will have on total unit equipment surge shipping capability by FY 91. Two significant points must be noted. First, we are incapable of meeting our total surge requirement; and second, unless the decline of the U.S. Merchant Marine Fleet is halted or reversed, or new ideas are developed, our capability will decline further.

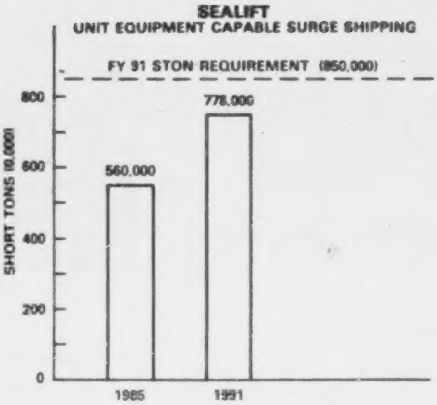


Figure 2.18

Specific Army programs are also intended to have a positive effect on overall mobility requirements. Most important in this category is the light division initiative. The light divisions are designed to be air deployable in far fewer C141B-equivalent sorties than the standard infantry division design. Their rapid deployability and high combat to support ratio characteristics may well preclude the later necessity to deploy a larger, more costly force. We are also aware of the need to address transportability as a critical factor in new equipment design. Modernized equipment, no matter how capable, is ineffective unless it can be efficiently transported to the theater and enhance battlefield mobility.

The Army's land and sea based prepositioning programs serve to reduce the total lift requirement by reducing the overall quantity of materiel requiring shipment, as well as the distance to be traveled from the prepositioning site to the area of operations. For example, Army readiness is being improved by the prepositioning in early FY 86 of combat service support equipment aboard a Heavy Lift Prepositioning Ship. Prepositioning combat service support equipment afloat in Southwest Asia was identified in the DOD Sealift Study as the best means for reducing early strategic lift requirements. The 8,000 tons of equipment aboard the Prepositioning Ships will be required to unload early arriving equipment and supplies arriving from Diego Garcia and fast sealift deploying from CONUS in support of U.S. Central Command contingencies. The combat service support equipment will provide the Logistics-Over-the-Shore (LOTS) capability necessary to unload material in areas where port facilities are limited or non-existent. Most of the equipment on the Heavy Lift Prepositioning Ship is difficult to deploy and could not be deployed by surface in time to meet force closure requirements.

Finally, working under the auspices of an Army-Navy Memorandum of Agreement, programs to balance Navy strategic sealift and Army-Navy offload and discharge systems are well underway. Navy fielding of Fast Logistics Ships, flatracks and seasheds, the Auxiliary Crane Ships, the Heavy Lift Prepositioning Ship and the expansion of the Ready Reserve Force have all contributed to reducing strategic sealift shortfalls. The Army has programmed discharge capability to match the Navy's delivery profile and satisfy the minimum LOTS requirement. Programs include modernization and upgrade of the Army's watercraft and tugboat fleet and the joint acquisition with Navy of causeway systems designed to make watercraft more useful in those areas of the world where shallow beach gradients limit LOTS operations. These joint efforts provide better systems and produce more capability per dollar expended.

Failure to fund strategic mobility programs and cargo offload systems will restrict the United States' ability to meet its global commitments in a timely manner. Without significant strategic lift the effectiveness of the Army as an instrument of U.S. national security policy is greatly inhibited.

Prepositioned Materiel Configured to Unit Sets. POMCUS is organizational equipment stored in company and battalion size packages, in a ready-for-use condition. The purpose of POMCUS is to position the majority of a unit's organizational equipment forward, so that in time of crisis only unit personnel, with minimum equipment, will require airlift to meet the requirements of a NATO contingency. During REFORGER 85, 3,250 vehicles (2,339 wheeled and 911 tracked), plus 1,677 trailers were drawn from POMCUS. Over 98 percent of the vehicles were operational when drawn. This high number of operational vehicles is evidence of the effectiveness of the POMCUS program.

The concept of POMCUS began in 1961. The Army POMCUS program is for six division sets of equipment. The site for the last set has been completed and the equipment fill for the sixth division set has begun.

Joint Deployment System. The Joint Deployment System (JDS) is a crisis execution system specifically designed to support coordinated, time-sensitive deployment planning and execution. It has been developed in response to critical deficiencies identified in major mobilization and deployment exercises since 1978, which focused on the need for centralized deployment management.

The baseline JDS was released world-wide in September 1985. This marked the transition of JDS from a prototype to an operational system, and concluded a four-year developmental effort. Fielding of the operational JDS provides the joint community with a powerful new capability to control and monitor the deployment of military forces. However, it also places additional manpower demands on commands and agencies involved in deployment planning and execution. Future demands for additional resources are expected as experience in JDS increases.

Transportation Automation. A major challenge exists to maximize peacetime, mobilization, and wartime transportation automation capabilities. As a result, a number of new transportation automation systems have been developed.

Recent progress has seen the successful testing of the Transportation Coordinator Automated Command and Control Information System (TC ACCIS) prototype, the Software Acceptance Test for the DA Standard Port System-Enhanced, the initial capability for the Installation Transportation Office/Military Transportation Management Command (MTMC) interface module of the MTMC's Crisis Action Management System, and the beginning development of the Container Management System.

Fiscal Year 87 initiatives will focus on systems which will generate timely, critical management information and will reduce manpower requirements within the logistics arena. Both of these objectives will be served by the continued development of the TC ACCIS Army standard version, the development of the Army standard version of the Automated Airload Planning System, the deployment of the Container Management System, the fielding of MTMC's Computerized Deployment System, the completion of the remaining modules of MTMC's Crisis Action Management System, and the development of the DA Movement Management System-Redesign. Full funding of these programs during their development is critical to ensure continuity and timely fielding.

Army National Guard Mobilization and Deployment Exercise Program. A formal mobilization exercise program was established in the ARNG in 1978. It is a multifaceted program geared to full participation in the JCS five-year exercise plan as well as participation in the actual mobilization process through unit level exercises.

In FY 85, for the first time, the level of funding provided not only for participation by early deploying units, but also for many of our major combat units. In FY 86, the program will be extended to all ARNG units.

Funding requested in FY 87 will provide for over 700 mobilization and deployment exercises in which ARNG units and personnel will have the opportunity to learn the mobilization process and evaluate mobilization preparedness.

U.S. Army Reserve Mobilization Exercise. During FY 87 the USAR will participate in an annual mobilization exercise which will exercise early deploying units. These units include those designated for early reinforcement of NATO, U.S. Central Command, and the theater defense brigade.

Individual Ready Reserve. The IRR is the largest of the Reserve categories of pre-trained individual manpower. The personnel assigned to this group will be used to bring AC and RC units to wartime required strength during periods of mobilization.

Strength of the IRR has long been an issue since the Army does not actively recruit personnel to be placed in this category. The program of transferring personnel into the IRR to complete their Military Service Obligation (MSO) has resulted in significant IRR growth. To enhance this growth, Congress authorized an increase to the MSO from six to eight years and provided funds for a reenlistment bonus. These two initiatives should result in the following growth in the IRR over and above the normal transfer program.

(NUMBER OF PERSONNEL IN THOUSANDS)

INITIATIVE	FY 87	FY 88	FY 89	FY 90	FY 91
8yr MSO	–	–	–	24.6	78.0
IRR Bonus	7.5	7.5	7.5	7.5	7.5
TOTAL	7.5	7.5	7.5	32.1	85.5

Congress has directed the Army to muster a portion of the IRR in 1986 to determine its availability and fitness for duty. A muster was held in January 1986. During this voluntary assembly, the IRR personnel went to a military facility close to their home, updated their personnel information, were physically screened, and received a briefing about reserve responsibilities and opportunities. Plans are being developed for an involuntary muster of major proportion during FY 87.

Current strength of the IRR as of 30 September 1985 is 301,825. It is projected to grow to over 505,000 by FY 92.

Individual Mobilization Augmentee Program. The Individual Mobilization Augmentee (IMA) Program grew out of the old Mobilization Designation Program. In October 1981, the participants were reassigned from the IRR to the Selected Reserve. As Selected Reservists, they are subject to the Presidential 100,000 call-up authority.

IMA, while Selected Reservists, are actually preassigned to AC units and organizations. Personnel assigned to IMA positions may also receive professional development training or take additional skill training in an effort to develop increased proficiency.

With the continuing cap on Active Army end strength, the IMA program, which numbered 11,922 as of 30 September 1985, can provide significant assistance in filling out active units and agencies.

Retiree Recall Program. The Army's retiree recall program was developed to offset the shortfall in pretrained individual manpower that would occur upon mobilization. Program goals are to provide mobilization manpower; to release AC individuals for reassigment or deployment as retirees become job proficient; and to provide CONUS base sustainment during the early days of mobilization. The program was implemented in August 1981 with the first "hip pocket" mobilization orders issued in November 1981. Presently, 130,000 retirees have been preassigned to CONUS installations. USAREUR has 4,100 preassigned retirees and Korea has 185.

The Army conducted the first exercise of its retiree recall program at Fort Jackson, South Carolina in October 1984. The test recalled 100 retirees from the surrounding area.

SUSTAINING THE ARMY

The Army has diverse and wide-ranging requirements for sustainment. This requires innovative approaches in organization, equipment and procedures. Better feeding systems, tactical water support, bulk petroleum distribution, war reserves and improved mobility provide increased staying power to continue the battle. Initiatives to improve equipment durability, organizational clothing, chemical defense equipment, maintenance and repair parts support address other sustainment needs of the Army. Several initiatives are underway to reduce the combat service support shortfalls. Forty-one units are scheduled for activation in the RC between FY 86 and FY 90. As logistics unit productivity systems are fielded, the spaces made available by increased efficiency are being applied to raise the authorization of combat service support units. Recent analysis applied 1,800 spaces to raise the authorization level of active combat service support units in the M + 10 essential force. The underlying approach to ensure improved productivity for soldiers and equipment drives efforts to provide a balance of sustainment capabilities.

War Reserves and Sustainability. War reserve stocks are established in strategic locations world-wide to provide an immediate supply of munitions, fuel, and major and secondary items during the initial days of combat for consumption until the supply pipeline can be filled from CONUS depots and manufacturers.

Modernization and changes to the force structure cause constant adjustments to stockage levels. Modernization provides new, more effective equipment resulting in overall sustainment gains. However, modern equipment requires different support items. The requirement to sustain a mixed fleet of older and modern equipment results in additional resource requirements. Although there has been steady improvement of the war reserve posture over the past several years, funding constraints, coupled with increasing and changing requirements, have prevented the Army from meeting its goals.

To achieve total war reserve stockage objectives based on funding alone, an overall investment of more than 15 times the current funding is required. One additional day of war reserve stocks costs about $1 billion.

Medical Readiness. Medical readiness is a measurement of the Army's ability to provide wartime medical support. It has been severely limited by a shortage of medical equipment and professional medical personnel needed to support wartime requirements.

In FY 84 and FY 85, 40 hospital sets were funded for procurement; these sets are the first to be configured with the new Deployable Medical Systems requirements. Fielding of the 13 hospitals acquired is projected to begin in 3rd quarter, FY 87. In FY 86 and FY 87, 45 hospital sets will be funded. Funding to equip the remainder of the medical force structure by FY 91 is programmed. Fielding of that equipment is projected to be completed within two years of funding.

Progress has been made to alleviate the critical shortage of professional personnel in certain specialties. The development of recruiting enhancements and new incentives are designed to attract and retain professional medical personnel in both the AC and RC. Personnel support to a deployable medical force would be adequate to provide care on a world-wide basis, though shortages of surgically related specialists (physicians and nurses) would exist in CONUS.

The CONUS Army medical support base has shortfalls in facilities and materiel to provide sustainment to committed forces. In the aggregate, the Army has sufficient capability to handle CONUS-generated patients for the first 30 days of a mobilization. However, inadequacies exist in health care support at semi-active and state operated installations which require either early mobilizing, late deploying medical units or other health care means to provide base support medical care to the mobilizing population. These shortfalls dictate a great reliance upon the Veterans Administration and the National Disaster Medical System for the care of evacuees from overseas.

Distribution of Bulk Petroleum. Distribution of bulk petroleum is one of the most critical elements of readiness and sustainability. The Army has the responsibility for petroleum distribution to all services in both a developed and undeveloped theater. It is the Army's mission to maintain a flow of bulk fuels from a combination of off-shore and pier-side tanker discharge systems through a network of on-shore storage and distribution systems.

Petroleum distribution equipment contained in the Army Facilities Component System (AFCS) is 30 to 40 years old, labor intensive and no longer commercially available. The Army is in the process of updating the AFCS and has programmed funds to improve petroleum products off-load and inland distribution through use of commercially available equipment. This equipment is quick and easy to install, increases unit productivity and reduces force structure shortfalls. Procurement of light weight aluminum pipeline, quick lock couplings and improved storage capabilities has begun.

An Army-Navy work group has been established to coordinate joint procurement and fielding of a common offshore petroleum discharge system including required documentation, doctrinal development and integrated logistics support.

Testing of ship-to-shore undersea pipeline and commercially available single anchor leg mooring systems was successfully completed in July 1985. A full system demonstration, including timed test, was successfully completed in October 1985. The Army has budgeted for acquisition of these systems in FY 86-87.

Tactical Water Support. The Army, as DOD Executive Agent for Land Based Water Resources Management in contingency operations, has developed, in close coordination with the other services and applicable DOD agencies, concepts and doctrine for water support.

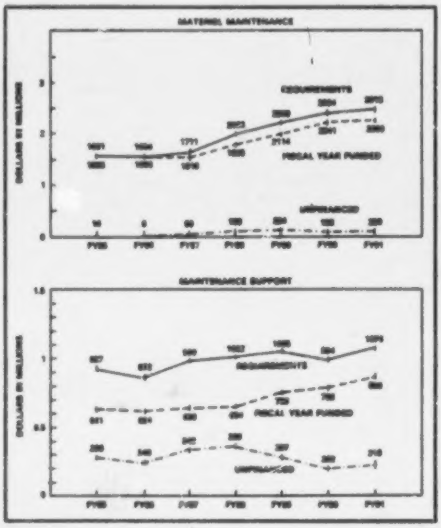
Tactical water support is a critical element of sustainability. Resources are required to provide water detection, production, treatment, storage, distribution, cooling and force structure support to U.S. Central Command forces in an arid environment. Equipment procured with prior year funds is being delivered and has been used to establish a training program at the NTC and the U.S. Army Quartermaster School. Additionally, equipment has been issued to deployable units authorized specific items, used to establish a training base for exercises, and stored as FORSCOM operational project stocks in support of Central Command requirements.

Research Department Explosive and High Melt Explosive. A master plan for the improvement of Research Department Explosive and High Melt Explosive (RDX/HMX) readiness was developed and forwarded to Congress. This plan was prepared as a result of an Army study on insensitive high explosives. The study highlighted shortfalls in the ability to provide explosives in emergency and mobilization conditions. The plan provides for the modernization and expansion of the Holston Army Ammunition Plant, Tennessee, establishment of additional RDX/HMX facilities and for the stockpile of RDX/HMX explosives. The FY 87 budget continues modernization at Holston (A-5 lines), and procures RDX/HMX explosive stockpiles.

Reichel Logistics Facility. In the late 1970s, analysis of the evolving threat to Europe's Central Region concluded that Northern Army Group (NORTHAG) would be defending against the most probable main attack of the Warsaw Pact. As a result, the United States agreed to reinforce this area outside the traditional U.S. area of operations. Concurrently, we made a national commitment to develop the capability to reinforce NATO with ten divisions within ten days. The Reichel facility is ideally located and suited to provide a cost effective logistical support coordination center necessary to accomplish reinforcement objectives in the NORTHAG region.

Congress has appropriated funds to transport and preposition war materiel in the NORTHAG area, and has authorized purchase of the Reichel facility. However, approval for obligation of funds has been withheld until completion of a study to determine the feasibility of closing or consolidating selected overseas facilities. Failure to purchase this facility precludes its full use and severely impedes the total process of development of the war plan. The Reichel facility also serves as a community support base for approximately 5,000 military personnel and family members in and around the Rheinberg community area. Present community facilities are woefully inadequate and our personnel are experiencing substantial hardships. This project remains USAREUR's highest priority for Military Construction funding.

Depot Maintenance Activities Unfinanced Requirements. Depot maintenance activities provide for the materiel overhaul, conversion, modification, repair, and renovation, as well as maintenance engineering, technical assistance, update of publications and new equipment training for the Army. The unfinanced requirements (backlog) associated with the materiel portion of the program is defined as that portion of the total executable requirement that cannot be funded with available resources. This backlog of the current year is cumulative and becomes an integral part of the following year's requirement. There is no backlog, as such, related to the maintenance support activities portion of the program which requires the restructuring of its total requirement yearly. The Army has made every effort to bring the Depot Maintenance Activities program to a zero unfinanced requirement. This was achieved for the depot materiel maintenance program in FY 82 and again in FY 86. However, constraints in funding have made this goal unaffordable for FY 87. Through the five-year period to FY 91 the Army is attempting to achieve a minimum of 93 percent of the executable program requirements throughout these program years. The depot materiel maintenance unfunded requirements are strictly a function of funding versus requirements. There are no backlogs in the FY 87-91 period generated by manpower shortfalls. The unfinanced requirements consist primarily of major end items. This is done to protect the repair of secondary items. The repair of secondary items provides more near term readiness by ensuring that major items which can be repaired below depot level do not remain unserviceable for lack of major components. The FY 87 budget holds the depot materiel maintenance unfinanced requirement at $93 million, 5.4 percent short of total requirement. The maintenance support activities are held at $340 million or 34 percent short of its FY 87 total requirement. As new and more sophisticated equipment continues to be added to the Army's inventory to increase combat readiness and effectiveness, the total Depot Maintenance Activity requirement continues to grow.



- *Figure 2.19*

STEWARDSHIP OF RESOURCES - RESPONSIBLE AND INNOVATIVE

The combination of a high quality, lean Army and the most extensive peacetime modernization in history focuses attention on the stewardship of resources. The Army's most important resource is its soldiers. Programs to ensure those soldiers have a quality of life that encourages excellence and that systems and organizations are designed to take maximum advantage of the quality of those soldiers are imperative. In addition to taking care of the needs of soldiers and families, the Army is providing responsible stewardship of resources. Through such efforts as pursuing productivity enhancing technology, providing more relevant combat power within constrained active end strength; trimming staffs; transferring appropriate missions and capability to the Reserve Components (RC); reexamining acquisition of equipment; taking innovative steps in information and resource management; and rationalizing the integration of soldiers, equipment, doctrine, and organizations into effective combat power, the Army is providing the leadership necessary to use resources efficiently and effectively.

A critical element of stewardship is jointness. This cross-service cooperation is institutionalized in the Army-Air Force Joint Force Development Process (JFDP). The JFDP stems from the recognition that no service has the resources to do everything that needs to be done. Achieving maximum combat capability from each defense dollar spent requires a joint service approach to force development, capitalizing on each services' inherent strengths and capabilities to meet effectively and efficiently the requirements of all.

A major accomplishment of the JFDP has been the termination of duplicative programs, with resulting near term cost avoidance. For example, the services restructured the Joint STARS program to seek opportunities for innovation and cost reduction, selected the C-18 platform to meet surveillance and attack needs, and terminated the Army's OV-1 Joint STARS modifications. Three JFDP initiatives address Air Base Ground Defense (ABGD). Air Force requirements for ABGD outside the base perimeter will be met by the Army; additionally, the Army will conduct training for Air Force security police in internal base defense. Consequently, the Air Force reduced its planned RC force by 3,300 spaces, terminated the Mobile Weapon System, and cancelled plans for 12 regional training centers. A further example of cost avoidance is cancellation of the Army's Airborne Radar Jamming System. The services have jointly developed procedures for use of existing Air Force assets to protect Army helicopters from enemy air defenses. The net result of one service supporting both services' requirements has been near term cost avoidance totalling hundreds of millions of dollars.

JFDP emphasis for the future is on institutionalization and expansion. The FY 87 budget is the first fiscal demonstration of the services' joint approach to force development. Because of the services' emphasis on development of complementary rather that duplicative capabilities, the budget now reflects more multiservice programs. It reflects procedures developed by all four service programmers to coordinate more fully our future programs. The other significant element of JFDP institutionalization will be the expansion of the Army-Air Force staff officer exchange program to include Navy participation and exchange officer representation in all major service staff functional areas. A positive step in fostering inter-service cooperation and understanding, this program is developing a pool of officers with unique experiences who can be tapped in the future for key joint assignments. The JFDP focus on operational issues necessarily includes assessments of other critical areas such as strategic deployment, sustainment of forces, and command and control. The Army and Air Force continue to pursue expanded Navy and Marine Corps involvement in areas of mutual benefit. Finally, recognition of the four-service applicability of many aspects of the JFDP is reflected in ongoing efforts to foster closer affiliation in the future with formal JCS processes.

Leadership is the essential element of readiness and stewardship of the force. The Army seeks to develop leaders with the highest ethical and professional standards. These leaders are committed to mission accomplishment and the well-being of subordinates. General George S. Patton, Jr. said, "Wars may be fought with weapons, but they are won by men." The human dimension is always critical in battle and the demands of modern war make the development of competent leaders during times of peace even more critical. We must have leaders at all levels who can exercise initiative and act independently to employ our forces effectively. We must prudently use our most precious resource—our soldiers—and employ our weapons systems and other resources for their greatest effect. Good leaders are essential for stewardship of the force. Part of that stewardship is enhancing the readiness of the force through sound preparation and training during peacetime.

Our effectiveness in peace and war depends on the professional competence, imagination, and integrity of Army leaders from the most senior to the most junior.

THE QUALITY OF LIFE FOR SOLDIERS AND FAMILIES

The Army Family. The impetus established during 1984, "The Year of the Army Family," carried through 1985 into 1986 as the Army continued to provide visible support of its commitment to Army families. The following examples illustrate some of the efforts that have been undertaken by the Army, with congressional support, during the past year.

A new sponsorship program was initiated. The objective is to ease stress associated with relocation and provide soldiers, Army civilians, and family members with information, advice and support to help newcomers get settled quickly and begin to feel at home in a new environment.

Improvements made in employment assistance and referral programs make it easier for Army family members to find jobs when moving to a new duty location. Family members of military and civilian employees serving in non-permanent positions overseas receive non-competitive consideration for civil service positions upon return to the United States. Working family members may register for priority consideration in CONUS when they relocate with a sponsor. Increased publicity of employment opportunities also has been provided. In addition, non-appropriated fund employees may now be reinstated to a non-appropriated fund position at a new location within six months of separation from a former assignment. Revised guidance has been issued to increase the emphasis and reduce barriers to the employment of family members in part-time, job-sharing and summer hire programs. Sixty-five Army locations have employment information centers in various stages of development providing consolidated federal, state and local employment information. The Army has been the leader in family member employment and is committed to even further advancement.

Recognizing the important contributions of the ARNG and USAR, the Army developed and began issuing reserve family member identification cards. While the cards themselves provide no benefits, they will make identification at installations easier and increase the partnership bond between the Army and this group of family members.

We are determined to do everything we can within available resources to improve the quality of life for our soldiers and families. The Army knows that stronger families make for a more ready Army. With the help of Congress, the Army can sustain this effort, and continue the progress. Our FY 87 budget addresses high payoff issues that require additional funding. The chart below depicts the resources required to support the Army family program.

These resources are part of the total quality of life program within the Army. They are designed to reduce stress on military families, improve those programs that support our families, and further close the gap which exists between the benefits and services available in the society that we are pledged to defend and the limited benefits and services that our soldiers and families currently have available to them.

Funds to accelerate long required upgrade and construction of child develpment centers are included in the FY 87 budget request. Child care is a readiness issue. Army active duty members have a total of 511,600 children under the age of 12. In 1985, Congress approved six child development projects. In 1986, 19 projects are funded and another 19 projects are requested for 1987. In addition, funds have been requested to monitor and train people who offer child development services in their quarters.

QUALITY OF LIFE PROGRAM

QUALITY OF LIFE MAKE UP ($ MILLIONS)

	FY 86	FY 87
FAMILY PROGRAM	1496.8	1840.3
CONSTRUCTION	974.3	668.2
COMMUNITY (LESS CDC CONST)*	(20.4)	(35.3)
MEDICAL	(111.5)	(0)**
BARRACKS & DINING FACS	(409.6)	(332.9)
MAINT & PROD FACILITIES	(432.8)	(300.0)
REPAIR & MAINTENANCE	2816.0	3041.0
CHAPLAINS ACTIVITIES	19.8	20.9
DRUG & ALCOHOL REHAB	20.1	17.8
COMMUNITY & MORALE SUPPORT	243.6	280.2
OTHER PERSONNEL SUPPORT	7.0	6.1
UNACCOMPANIED PERSONNEL HOUSING OPS & FURNISHINGS	94.7	108.2
TOTAL	5672.3	5981.7

*CHILD DEVELOPMENT CENTER
**PROGRAM MOVED TO OSD CONTROL

Figure 3.1

New programs also address family initiatives in support of the Army Community Service (ACS) program, the primary resource for family support on Army installations. ACS has never been adequately funded to perform its missions and provide the services Army families deserve. While funding initiatives in FY 86 began to close the gap, our request for FY 87 would serve to improve markedly their ability to provide necessary services. A financial assistance and consumer education program will offer education and debt liquidation counseling to soldiers and their families. This program has taken on new significance in support of the Sure Pay initiative. ACS centers will also offer counseling and supportive services to handicapped family members, information and referral, follow-up and foster care. The funds requested in FY 87 would fully fund the program at all 166 ACS centers and provide for collection of information regarding world-wide medical and educational resources for use in the automated assignment process of soldiers. Other family programs include outreach for junior enlisted personnel for the Active Army, Army National Guard and Army Reserve, and for installation volunteer coordinators.

Military Retirement. The Army believes that the current retirement system has served us well. While there has been growth in costs in recent years, the largest portion (55 percent) has been due to inflation. The second largest portion (21 percent) is due to much needed increases in basic pay. The increase in the retiree population constitutes 19 percent of the increase and an additional five percent is due to adjustments to retired pay. The growth in the retiree population results from the post World War II decision to maintain a larger Active Army. The bulk of this growth has already occurred. The retirement system will not experience rapid future growth and serious personnel losses could occur from relatively small changes in continuation rates. Such losses of experienced personnel will hurt readiness and will jeopardize the volunteer basis for manning the Army. The current retirement system continues to support successfully the Army's manpower policies.

Army Medical Enhancement Program. The Army Medical Enhancement Program (AMEP) is a program to improve the availability and the quality of Army medical care.

During the 1970s, the Army Medical Department experienced critical shortages of physicians due to the termination of the Berry Program. Physician resources were used to sustain specialty care at medical centers until physician end strength could be rebuilt. The Health Professional Scholarship Program, implemented in 1972, has improved physician end strengths although some imbalance in the specialty mix remains. The AMEP will enhance primary care capability while maintaining specialty care programs at medical centers.

Each active duty Army family will be assigned to a primary care physician. The assignment of a primary care physician will create informal health maintenance organizations at each post so that families know which physicians are providing their medical care and who they should turn to if there are problems. The mix and number of physicians will be determined by the number and mix of the patient population.

Current general medical officer authorizations are being converted to board-certified family practice positions, and recruitment efforts have begun to speed implementation. Board certified physicians will provide a better trained physician, thus providing better care and reducing the number of medical referrals to other clinics.

Military Construction. The Military Construction, Army (MCA) program, which constitutes only 2.4 percent of the total budget request, is one of the principal means by which the Army pursues the goal of improving the living and working conditions of our soldiers and their families. Military construction funds finance the construction, rehabilitation or replacement of the facilities the soldiers need to live, train and maintain. Twenty-five percent of the FY 87 construction request will provide new or upgraded barracks for over 14,000 soldiers, along with dining, community and medical facilities. Over 35 percent of the request provides for improved operations and training facilities such as ranges, instructional facilities and security upgrades. More than 20 percent of the request provides for improved maintenance, supply and administration facilities. The remaining 16 percent of the request provides funds for research and development facilities, improved utility systems, land purchases, planning and design costs and minor constructions. The payback on this investment account in terms of recruitment, retention, readiness and efficiency far exceeds its actual cost. Our construction program reflects an obligation to our nation and our soldiers.

Family Housing. The availability of adequate, high quality family housing is an important factor in the quality of life enjoyed by soldiers with families. Prior to FY 84, family housing was severely underfunded as a result of fiscal constraints, unrealistic inflation rates, unexpected increases in fuel cost and, during FY 78 through FY 80, unfavorable fluctuation in foreign currency exchange rates. These factors and others combined to generate large backlogs in most areas of family housing. However, since FY 84 family housing has begun to emerge as an adequately funded program. The FY 87 request to establish a foreign currency fluctuation account is imperative to the viability of the family housing program overseas.

In response to Army initiatives, the Defense Family Housing Management Account was transferred back to the services for full management. Transfer of the account has resulted in the Army's ability to prioritize resources against its housing needs. It gives the Army an increased capability to balance its facilities accounts and fix its family housing deficits. The backlog of Deferred Maintenance and Repair (DMAR) was substantially reduced for the first time during FY 83.

In FY 85 the Army initiated a program for a stable annual investment to rehabilitate, renew, or replace those deteriorated or obsolete dwelling units currently in the Army inventory. The FY 86 budget continued the Army attack on large maintenance backlogs to improve the living conditions of our soldiers and their families. Build-to-lease and Rental Guarantee programs are innovative concepts which were first approved in FY 84 to provide additional housing at CONUS locations. Additional authorization was provided in FY 85 to accommodate stationing of new light infantry divisions and Congress extended the program through FY 86.

The Army Family Housing appropriation is shown in Figure 3.2. For FY 87 there is growth in all areas of construction, leasing, operations and maintenance. The FY 87 budget reduces DMAR by $18 million; constructs mobile home facilities for 108 units; constructs 3,412 new housing units (CONUS-2,608; Europe-668; Other-136, includes 120 new attic units); eliminates or upgrades 1,359 substandard units into 1,124 adequate dwelling units; improves energy efficiency in over 11,887 units; and provides whole-house renewal for 2,520 units. Additionally, the budget requests authorization for 30,676 leases which support the needs of forward deployed soldiers, provide housing for Department of the Army civilians living in Germany and Korea, and support the Build-to-lease and Rental Guarantee programs.

The FY 87-91 Family Housing Program will:

- Eliminate the housing deficit;
- Reduce the deferred maintenance backlog to a manageable level by the end of FY 88;
- Eliminate or upgrade all substandard housing by the end of FY 89;
- Complete the energy conservation improvement program;

ARMY FAMILY HOUSING
($ IN MILLIONS)

	FY 85 ACTUAL	FY 86 APPROPRIATION	FY 87 REQUEST
NEW CONSTRUCTION	29	145	293
IMPROVEMENTS	100	102	146
PLANNING & DESIGN	14	15	24
OPERATION & MAINTENANCE	1,078	1,063	1,106
LEASING	105	114	163
DEBT PAYMENT	2	1	1
	1,328	1,430	1,733

Figure 3.2

Commissaries. The mission of the Army commissary is to provide resale items to authorized patrons at the lowest practicable price in a facility designed and operated similar to standards used in commercial supermarkets. Army commissaries provide an essential non-cash benefit which is considered as an entitlement for soldiers recruited under the present voluntary recruitment program. Commissaries play a key role in maintaining morale and ensuring a high quality of life for the Army family.

The commissary construction program provides for replacement or modernization of commissaries from surcharge funds paid by commissary patrons.In 1986 and 1987 the Army plans to spend $124.8 million in surcharge funds on replacements and major renovations of 19 commissaries world-wide.

Dining Facility Modernization and Construction. Dining facilities are an important part of the Army effort to improve the quality of life for the soldier. Good dining facilities have a positive impact on soldier morale and contribute to unit cohesion and soldier retention. The Dining Facility Modernization/Construction Program is a Department of the Army initiative to upgrade 221 troop dining facilities to DOD standard by providing modern food service equipment, serving lines to support regular and short order menus, and a contemporary dining environment. This program includes plans to construct new facilities that can provide quality of life benefits which may not be possible, even with extensive modernization, or because existing facilities have deteriorated beyond repair. New facilities will also be constructed to support force structure changes and unit activations. The funding profile provides a sound program which will eliminate the modernization backlog by 1995.

Army Equal Opportunity Program. The Army has long recognized that an essential ingredient of force readiness is human resource readiness. A critical factor in maintaining a high level of human resources readiness is ensuring that all soldiers have an equal opportunity to excel, based solely on merit, fitness, capability, and potential. Army leaders and commanders at all levels have taken positive actions to continue to embed firmly the equal opportunity function within the Army's leadership framework.

Minority and female representation in the Officer Corps is the highest it has ever been, and soldier opinion surveys indicate that the positive attitude toward equal opportunity continues to increase. Equally significant, incidents of sexual harassment continue to decline, and Army-wide trends show that this unacceptable behavior has become a less serious problem.

Alcohol and Drug Abuse. Alcohol and drug abuse in the Army has been on a steady decline since 1982. Progress in this area is attributable to command involvement, more sophisticated detection methods, and policies which reinforce the Army's intolerance of substance abuse. A forensically credible drug testing system and more stringent personnel policies are effectively deterring drug abuse. Deglamorizing alcohol and an effective drunk driving enforcement program are two initiatives designed to reduce the adverse effects of alcohol abuse. For soldiers with substance abuse problems who have potential for future service, the Army offers an effective rehabilitation program.

Admitted use of marijuana, the most popular illegal drug, by first term soldiers is at the lowest level in 11 years. Surveys indicate that consumption of alcohol is decreasing. Since FY 82 the alcohol and drug abuse rehabilitation program has consistently returned to duty over 70 percent of the soldiers they have treated.

Discipline of the Force. Since FY 74 all four major crime categories (violent crime, crimes involving property, Absent Without Leave (AWOL) and desertion), displayed a steadily declining statistical trend. Credit for this decrease in indiscipline can be attributed to many factors. Chief among them are the accession of highly motivated, quality soldiers; a concern with discipline shared by commanders at all levels of Army leadership; and a vigorous Army crime prevention program. A comparison of FY 85 indiscipline rates per 1,000 with FY 84 rates shows the decline continuing in violent crime, property crime and AWOL. The desertion rate per 1,000 has increased 8.2 percent, but probably reflects a statistical aberration rather than an upward trend.

Given the continued accession of high quality personnel and the maintenance of a healthy command climate that supports discipline, these generally favorable trends should continue.

INDICATORS OF DISCIPLINE IN THE ARMY

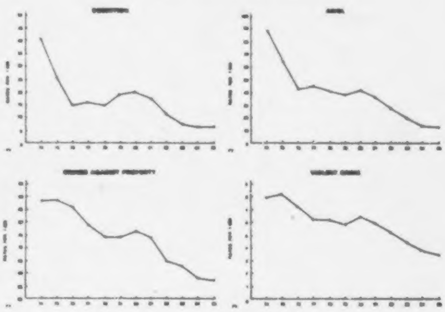


Figure 3.3

Army Safety Program. The Army Safety Program is dedicated to the preservation of resources. Annual goals of the program are to reduce loss of manpower and materiel from accidents and provide a safe and healthful environment for all Army personnel.

During FY 85, the Army reduced the number of Army motor vehicle accidents, but experienced a slight increase in privately owned vehicle (POV) accidents. Ongoing countermeasures targeted at reducing major causes of POV injuries center around the mandated use of automobile restraint systems and drug/alcohol driving education programs. The success of these measures can be measured in the decline in fatalities experienced during FY 85.

A shortfall in FY 85 was the Army's failure to achieve the Presidential and Secretary of Defense goal of a 3-percent reduction in civilian injuries. Plans, initiated by the Chief of Staff in

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SafeArmy 1990, have been implemented to achieve the overall Presidential 5-year goal for both military and civilian injuries.

Reserve Component Initiatives. There are several RC-unique initiatives and challenges facing the Army during FY 87. These include the issues of 40 and over cardiovascular screening for reservists; preparing and maintaining dental records for reservists; and the issue of paying reservists while they are attending U.S. Army Reserve schools.

All soldiers age 40 and over are required to undergo cardiovascular screening before taking part in the Army Physical Fitness Program. This program was implemented in the AC in 1981 and is now in a test stage in the RC. The program provides an indicator of cardiovascular condition, which is an element of the overall physical fitness of Army reservists. The ultimate objective is that in the event of mobilization, the entire RC will be physically ready and capable of performing its mission.

Dental records are a vital link in the identification of human remains. The Army leadership has expressed concern that many reservists either lack dental records or have incomplete dental records. A comprehensive program has been designed to correct this problem. The highest priority will be given to obtaining and protecting identification panographic x-rays and to ensuring that records of RC soldiers who train outside of the United States are complete and accurate.

U.S. Army Reserve schools play a vital role in the training of RC soldiers. The schools offer the Command and General Staff College Course, warrant officer entry courses, enlisted job related courses, NCO leadership courses and other courses supporting the NCOES. To increase enrollment in these courses by USAR soldiers, a test is being conducted to determine if it is feasible or desirable to pay these soldiers while attending USAR school courses.

Antiterrorism. Terrorism directed against the U.S. Government has continued to increase in both number of actions and the severity of those acts. In response, the Army is executing its responsibility to provide protection to soldiers, their families, and civilian employees through a force protection program which includes the areas of training, physical security, intelligence, and personal protective measures.

Intelligence resources to support the program remain insufficient. However, security enhancements at the most critical installations have been initiated to meet the threat. The current concept is to use state-of-the art technology to supplement manpower, e.g. automatic barriers, detection systems and robots. In consonance with these improvements, continued congressional support and funding are necessary to provide the required physical security improvements, continue to develop the antiterrorist capabilities of both installations and units, and develop an antiterrorism information system.

Domestic Assistance. The Army actively provides assistance to the U.S. public in peacetime to include support for natural disasters, civil law enforcement, shelter for the nation's homeless, and significant international athletic events in the United States.

In support of the DOD policy of maximum assistance to the nation's war on drugs, the Army has augmented the Office of the Vice President's National Narcotics Border Interdiction System regional centers with permanently assigned personnel. They coordinate the legal involvement of Army personnel and logistics assets in indirect support to civil law enforcement drug interdiction initiatives. Extensive support to drug enforcement operations has included employment of Army mobile radar units, helicopters, communications, and night vision and surveillance equipment. The Army has loaned 23 aircraft to the U.S. Customs Service and the Border Patrol. In FY 86, the Army will also loan two Black Hawks and six C-12C airplanes to the U.S. Customs Service, as directed by Congress, and five observation helicopters to the Border Patrol. In addition, the ARNG provides a significant amount of support to the domestic marijuana eradication program through the use of aircraft, vehicles and personnel working with federal, state and local law enforcement agencies. This support is conducted in conjunction with scheduled training exercises and in a State active duty status. Loans of equipment and support to drug interdiction missions will continue as long as national security and military preparedness are not adversely affected.

Army support to the Shelter for the Homeless Program continues. Four shelters are currently operating with Army assistance. The Army committed $811 thousand in FY 85 for new projects at Fort Meade, Maryland and Seattle, Washington.

The Secretary of Defense approved the use of Fort Benjamin Harrison, Indiana as an athlete village for the 1987 Pan American Games in which approximately 5,200 athletes will participate. For FY 86, $10 million has been appropriated for this support, and another $25 million is expected for FY 87.

PRODUCTIVITY ENHANCEMENT

With the constrained active end strength and civilian force, the Army is increasingly examining methods of improving the productivity of the force through the use of technology. With the recognized need to deploy rapidly light forces, special efforts are being made to improve the tooth-to-tail ratio, the relationship between combat and support soldiers.

The Army has successfully applied productivity and efficiency tools in many activities. Efforts are being intensified in other areas and at all organizational levels to ensure maximum productivity increases.

Personnel Service Support. The Army has significantly reduced the personnel and administration support structure of the Army's corps and divisions. To accommodate these cuts, a functional redesign of the personnel and administration (P&A) system was necessary.

A task force conducted a bottom-up scrub of every task and procedure accomplished in the P&A organizations of the Army. The scrub generated more than 500 work reducing ideas, many of which have already been executed. While it is too early to assess fully the long-term manpower payoff, the potential exists for significant work productivity.

The work done thus far by the personnel community has significantly improved personnel support operations and is very necessary as the Army continues to modernize.

Transportation Operational Personal Property Standard System. The Transportation Operational Personal Property Standard System (TOPS) is a joint service non-major management information system designed to automate administrative functions at Army personal property shipping offices. TOPS standardizes, through automated processes, the DOD Personal Property Moving and Storage Program.

The General Accounting Office identified personal property as an area needing improvements. In addition to productivity benefits through standardization, additional benefits resulting from improving quality control of commercial movers, reducing claims for loss and damage, reducing the incidents of "poor" moves which impact adversely the soldier through out-of-pocket expense, and significantly reducing incidents of late arriving documentation which severely impairs the early analysis of unsatisfactory transportation carriers' service.

Logistics Applications of Marking and Reading Symbols/Microcircuit Technology in Logistics Applications. Logistics Applications of Marking and Reading Symbols (LOGMARS) represents the introduction of bar code technology into the DOD Logistics System. Microcircuit Technology in Logistics Applications embraces a wide range of automatic identification devices and methods of storing and transporting bulk data that does not lend itself to bar codes. Initial application prototypes are expected to be tested during FY 86. Objectives of these programs include greater accuracy, improved production flow, increased asset visibility, reduction of documentation requirements, order and ship time and stockage investment levels. Cost avoidance is projected to be approximately two dollars for each dollar invested.

Combat Field Feeding System. The Combat Field Feeding System was implemented to maintain high standards for feeding soldiers in the field while allowing a reduction in numbers of cooks to support increased combat strength in units. Hot field meals will be primarily from the new tray pack. The tray pack is a sealed tray-shaped can containing an entree, starch, vegetable or dessert which is heated by submersion in boiling water. Initial Active Army cook spaces realigned under this system are about 3,500. The reduced authorization for cooks requires the conversion of some garrison dining facilities to contract operations and supplementing military cooks with direct-hire civilian cooks.

Supply and Maintenance Assessment Review Team. The primary purpose of the Supply and Maintenance Assessment Review Team (SMART) is to improve the Army's logistics support by eliminating administrative burdens, streamlining current systems, taking advantage of technology, and implementing good ideas or suggestions in an expeditious manner. Project SMART, a key "soldier-helping" program, has saved hundreds of man-years and millions of dollars over the last three years. For example, the 1,185 ideas received during FY 84 exceeded the total number of ideas received during FY 82 and FY 83 combined. Over 2,000 ideas were received during FY 85.

ACQUISITION

Defense Acquisition Improvement Program. To improve the way DOD acquires its materiel over 30 areas for action have been identified. Through consolidation and closure of issues, these actions were reduced to six. A seventh issue, strengthening the industrial base, was added during FY 84. These Defense Acquisition Improvement Program issues and some recent achievements are:

Program stability - Production quantity floors were maintained for selected programs. Program stability is expected to be enhanced greatly for FY 86 and beyond by the new program management control system. The restructured program management control system provides intensive management for major programs, including high level agreement on program baselines, a more disciplined change process, increased visibility of program trends, improved program stability, and greater control over costs. The bottom line objective is program stability, leading to a fundamental improvement in the Army's ability to reduce costs.

Multiyear procurement - Five additional programs were approved during FY 85 and six were approved for FY 86. The Army is requesting two new starts for FY 87.

Economic production rates - The Army continually uses economic production rate information to evaluate production purchases at the lowest possible cost. Currently 17 major systems are evaluated against these criterion.

Realistic budgeting - A broader implementation of Total Risk Assessing Cost Estimate-Production increased the efficient use of the FY 85 budget. Further improvements are planned for FY 86. Present projects focus on data base development, cost estimating relationships, and cost factors.

Improved readiness and support - General officer and SES review of working group initiatives at quarterly reviews resulted in improved readiness of equipment.

Encouraging competition - Regulation requires establishment of competition, where possible, by Decision Milestone III. All future acquisition plans must address competition.

Strengthing the industrial base - A milestone schedule and plan of action to improve industrial base preparedness planning has been developed. Ongoing efforts include the creation of an automated data base for analysis of industrial base issues.

The Army is instituting initiatives to reduce costs and develop a comprehensive, up-to-date cost estimating data base as a prerequisite to the development of independent cost estimates and the performance of cost research.

Multiyear Procurement. In considering candidates for multiyear contracts the Army uses the basic criteria established in the FY 82 Authorization Act: (1) Benefit to Government, (2) Stability of Requirement, (3) Stability of Funding, (4) Stability of Configuration, (5) Degree of Cost Confidence, and (6) Degree of Confidence in Contractor Capability.

The current challenge facing the Army is one of maintaining stability of funding for multiyear candidates while at the same time maintaining the management flexibility required to deal effectively with downward adjustments to total obligation authority.

The success of a selective multiyear approach is reflected in the estimated cost avoidance for FY 85 and FY 86 of $401 million and $755 million respectively.

Reducing Operational Support Costs in Research, Development & Acquisition Process. Taking steps to reduce Operation and Support (O&S) costs in the RDA process is a key initiative that is receiving renewed emphasis in the Army. The emphasis is on reducing weapon or system O&S costs by addressing early in the RDA process engineering concepts, procedures, techniques and technological approaches to improve logistics support and supportability. Appropriate funding support for this initiative is identified and allocated as an integral part of the program funding profile. Additionally, the Army is initiating a dedicated program effort in FY 87 for logistics R&D (battlefield sustainment), which focuses on identifying logistics deficiencies, developing solutions to the deficiencies and having each solution systematically addressed, and incorporated in the RDA program.

Competition Advocate Program. The Army's Competition Advocate Program was started officially on 1 April 1985. The Army policy on new starts is to compete to the maximum extent practicable. Spare parts are to be broken out and purchased directly from prime contractors when possible.

To achieve success in promoting full and open competition the Army appointed 240 competition advocates. They will assist the approximately 9,000 people involved in the acquisition process. Each competition advocate has the same charge: press for competition in the procurement process. These competition advocates have helped the Army exceed its FY 85 goal to have 46 percent of the total dollars awarded competitively. The Army awarded 46.9 percent of all procurement dollars, a total of $14.9 billion, competitively. This was an increase of $3.9 billion over FY 84. Additionally, 61.7 percent of all contract actions were awarded competitively, a four percent increase. Examples of successes are:

·Tank Automotive Command (TACOM), a major subordinate command of Army Materiel Command (AMC), avoided a $511 thousand expenditure on a recent contract by developing a second source for fire extinguishers used in the Fire Suppression System of the Bradley Fighting Vehicle. TACOM worked with the vehicle contractor to develop a second source for extinguishers on the production contract, cutting the cost of extinguishers by 39.5 percent.

· Dramatic improvements have been realized from Army's Spare Parts Review Initiatives Program and AMC Spare Parts Task Group. Approximately $250 million in cost avoidance was realized during FY 85.

·The Missile Command selected the Hellfire launcher for breakout from the sole source contractor. A second source made a successful bid which reduced the unit price 67 percent and resulted in a price reduction of $10,821,339.

Contract Fraud and Irregularities. During 1985, the Army has substantially increased its efforts in combating contract frauds and irregularities. Sixty-six contractors were suspended and 116 were debarred from doing business with the government. This was a 75 percent increase over calendar year 1984 and a 168 percent increase over 1983. Since 1 January 1985, over $3 million has been collected from contractors who had defrauded the government. In comparison, 1984 recoveries were less than $250 thousand. Factors which contributed to this substantial increase are:

- The system used to remedy contractual irregularities and frauds, put into operation in 1983, is beginning to mature;
- Early contact with investigators, auditors and contracting officers;
- The number of cases reported to the Army is increasing.

EFFICIENCY IN RESOURCE MANAGEMENT

The Army has successfully applied productivity, efficiency, and management improvement tools in many activities. Constrained resources clearly demonstrate that improved capability must be generated through productivity gains. Increased productivity is an area of intense effort by all levels of Army leadership. The Army's productivity plan builds on the already successful productivity and efficiency initiatives at installations, such as, Productivity Capital Investment Programs, Value

Engineering, Organizational Efficiency Reviews, Model Installation Program ideas, and Standard Installation Organization concepts. Results expected from these efforts and workforce motivation programs such as Quality Circles and Productivity Gain Sharing are a more positive environment to meet the resource challenge to produce a better Army. Through active involvement of soldiers and civilians at every level, Army leaders will have opportunities to obtain modern equipment and facilities; to apply productivity gains in certain areas toward other priority initiatives; and to achieve an efficient and cost effective organization. All these achievements will assist the Army in meeting the President's goal to increase productivity by 20 percent over the next seven years.

The Model Installation Program. The Model Installation Program (MIP) continues to produce very positive results for the Army. During FY 85, this initiative eliminated obsolete procedures and encouraged smart new ideas at designated "test beds." The program has been expanded from six installations to ten and those installations have generated over 2,900 suggested ways of improving how the Army does business. These suggestions have ranged from the elimination of reports to the use of the state-of-the-art laser printers. The concepts of decentralizing and decontrolling have been expanded into a number of other areas to include engineering activities, logistic functions and RC activities.

A number of MIP suggestions have already triggered changes to Army regulations or procedures that will make better use of limited resources. Examples include the submission of a natural resources report "as required" rather than annually and allowing drivers of commercial-type vehicles to use a valid state drivers license instead of requiring a separate military license.

Standard Installation Organization. The Army has made great strides in focusing on improving overall installation management. During FY 86, the Army will institutionalize the standard installation structure with standard core functions. The Army expects to gain many benefits from this management initiative, such as:

- Facilitating the transition from peace to war by ensuring adequate support to the RC units that will replace deploying active units during mobilization.
- Linking organizational and functional requirements to the Planning, Programming, Budget and Execution process. Through this linkage, the Army can develop acceptable performance factors and results for each core function and measure resources applied and results achieved.
- Providing consistent and predictable support to the members of the Army family.
- Providing the development of standard management and information systems for use at all Army installations.
- Providing the basis to increase the efficiency and effectiveness of installation base operations.
- Assisting the Army in developing a cadre of professional managers to operate Army installations.

Base Closures. In response to increased interest in achieving savings and efficiencies through base closures and realignments, the Army has undertaken several actions to study its overall base structure and real property holdings. The purpose of these analyses is to determine where consolidations and/or closures of Army installations can be undertaken that will allow a more effective use of the Army's resources with no detrimental impact upon the Army's ability to perform its missions. Within the past year, the Army has announced major realignment actions that will consolidate all engineer training at Fort Leonard Wood, Missouri; the Intelligence and Security Command Headquarters at Fort Belvoir, Virginia; and will allow the Army to move several headquarters out of expensive leased quarters to Army installations. The Army has also reviewed several pieces of proposed legislation that would expedite procedures for base closure and realignment action. All pending bills have been supported and, if passed, will result in a greater ability on the part of the Army to achieve productivity gains and efficiencies in developing its overall force structure.

Organizational Efficiency Review Programs. During FY 85, efficiency reviews conducted for both contractible and noncontractible functions expanded in all major commands. Forty studies of commercial (contractible) activities involving over 2,550 spaces conducted in 1985 resulted in realignment of over 1,000 civilians and 605 military spaces. Studies of noncontractible functions generated an additional 431 spaces for application to high priority work. The recent merger of these two programs will increase coordination and allow commanders to reallocate organizational review personnel between programs to achieve efficiency review study objectives. Additional emphasis has been placed on completion of ongoing studies of contractible functions prior to the end of FY 87. This effort will contribute to the overall improvement of Army management objectives by concentrating efforts on the most productive areas. In addition, the efficiency with which the Army executes the programs will be increased by reducing duplication and by sharing products.

Productivity Capital Investment Programs. Army commanders are aggressively pursuing these programs to improve their resource use. The programs provide seed money for fast payback tools, equipment and facilities that save manpower, reduce costs, increase productivity and improve readiness. Results are better managed and supported organizations with soldiers trained with state-of-the-art equipment, leading to a more ready force. Examples of equipment are training weaponeer simulators which enhance marksmanship feedback and also save live ammunition; asphalt reclaimers that repair roads destroyed by heavy equipment during training exercises; airport surveillance equipment, tactical vehicle washracks; and other labor saving equipment which enables soldiers to perform their combat mission better. The programs historically have a return on investment of $17 to every $1 invested.

Value Engineering. The Army's Value Engineering (VE) program is designed to lower the cost of functions while achieving equivalent or better performance and reliability. Examples of in-house VE are a proposal at a depot which results in cost avoidance of $6 million on the CH-47 overhaul and a VE study of a firing range which resulted in $9 million in cost avoided. Army contracts contain the VE Incentive Clause which encourages contractors to submit resource conserving VE Change Proposals. Contractors can share up to 50 percent of the net reduction in contract costs resulting from Army accepted proposals. For example, the proposal submitted and accepted on the M577 and M582 fuze contract resulted in a $16.4 million reduction in cost of the contract. VE produces an average return on investment of $15 for each $1 invested.

Army Energy Program. Executive Order 12003, June 1977, required all federal agencies to reduce gasoline consumption by 15 percent and energy consumption 20 percent per square foot of active floor space by FY 85 compared to the FY 75 level of consumption. The Army has operated an extensive energy conservation program with the overall objective of conserving energy without degradation to readiness, training, or quality of life for soldiers or their families.

Based on FY 75, Army energy consumption for FY 85 was reduced by nearly 23 percent per square foot and gasoline consumption was reduced by nearly 25 percent. Cost avoidance for FY 85 was $600 million.

Total cost avoidance since FY 75 is over $3 billion. The Army will continue the Energy Conservation Investment Program, construct more energy efficient buildings and emphasize energy consumption when developing new equipment. Cost avoidance for FY 87 compared to FY 85 should be $100 million.

Non Tactical Vehicle Program. The non tactical vehicle (NTV) fleet consists of 71,574 commercial vehicles required to support training, security, medical, sanitation, facilities maintenance, and other essential functions at Army installations world-wide. About 30 percent of the current fleet is replacement eligible (overage/overmileage/short). Due to recent funding reductions, the NTV fleet will have a replacement backlog of 34 percent by

FY 91. Shortfalls in the program increase operating and maintenance costs, leasing requirements, fuel consumption, and use of tactical vehicles in administrative roles.

Condition of Real Property. The average age of the Army's physical plant is 35 years. As facilities age, major components wear out and require extensive repair or replacement. Since these requirements occur at different intervals, the funding needs for a facility which is 20 or 30 years old are considerably different from one that is 5 to 10 years old. Compounding this is the fact that the Army's physical plant becomes more complex with force modernization and changes in living and working standards. The Army recognizes that resource levels must be raised to reverse the deterioration of the physical plant. The decline in maintenance backlog, down to $1.148 billion by the end of FY 85, is an indication that the condition of real property is improving.

The FY 87 budget will hold facilities deterioration in check. Extensive renovation will continue to drive costs higher as components wear out due to age and usage, and related resource requirements will remain high for the balance of the eighties. The requested funding level must be fully supported to maintain facilities at standards that provide proper living and working conditions.

Installation Restoration Program. The need to address contamination problems associated with past activities, such as industrial manufacturing, weapon system production, and waste disposal was recognized in 1975 and the Installation Restoration Program (IRP) was established to identify, assess and clean up contamination on Army properties. The IRP is the Army program to comply with remedial response requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund) and Executive Order 12316, Responses to Environmental Damage.

Since 1975, the Army has assessed 181 of its installations for potential contamination problems. It is estimated that remedial actions will be necessary at 50 installations. Five installations have already been completed and the cleanup efforts are ongoing at an additional four installations. The majority of problems involve soil and groundwater contamination by explosive compounds, solvents, and heavy metals. Cleanups are expensive and typically involve landfill closure, removal or treatment of contaminated waste materials, and groundwater restoration. In some cases contamination has migrated off post and has affected civilian water supplies. The U.S. Environmental Protection Agency has included 23 Army sites on the National Priorities List of hazardous waste sites.

Given current technologies, the estimated cleanup cost for the Army is $1.5 billion. The level of funding must be fully supported to protect the health and safety of troops and nearby civilian communities and to allow mission activities to continue uninterrupted.

Fort Drum Construction Financing. The Army has proposed an innovative method for funding the construction of facilities at Fort Drum for the 10th Mountain Division (Light Infantry). Salient features of this method include:

- Congressional approval to authorize the total project in FY 86 and advance appropriations for FY 87, 88, and 89 so that funds appropriated precede obligations incurred.

- Advance appropriations that become available in the fiscal year for which they have been identified and appropriated, thereby eliminating the requirement for full scoring in FY 86.

- Advance Military Construction, Army (MCA) appropriations requested are:

  FY 87: $232 million

  FY 88: $221 million

  FY 89: $162 million

- Large construction contracts to maximize economies of scale, achieve faster completion, and other management efficiencies. This should ultimately result in cost savings to the government.

INFORMATION MANAGEMENT

The information management goal is to design, build, and field command and control and support systems so the Army can operate the same in war as in peace. The focus of this effort is the need to integrate the five major disciplines of information communications, automation (to include office automation), audiovisual, records management, and publications. This will assure resources are focused to improve readiness.

The highest priority in information management is to assure integration and interoperability in information systems and between the theater and tactical, strategic, and sustaining base arenas.

At the theater and tactical level, information management is being rapidly modernized with nearly one-half of the information resources being devoted to the Army in the field. The connection of combat radio nets, data distribution, and area communications networks support the synchronization of maneuver, fire support, air defense, intelligence, and combat service support units. The fielding of key systems such as SINCGARS, ADDS, MCS, and MSE before the end of the decade will greatly enhance execution of AirLand Battle doctrine. Taking advantage of technological advances such as fiber optics, the Army will improve strategic communications. Satellite communications terminals for use on MILSTAR and DSCS are being procured to provide for today's changing environment.

The historically artificial distinctions among the information disciplines, and the tactical, strategic, and sustaining base arenas have been broken, and represent an ambitious and highly successful first step toward ensuring the reality of the "White House to foxhole" connection.

Communication Technology. The Army has explored the potential military use of electronic media and systems for computer based instruction, tele-training and conferencing. Field evaluations show positive results for effective information transfer and cost avoidance.

The interactive computer controlled videodisc system is scheduled for initial procurement in FY 86 for use in Army schools. This will be followed by selected distribution to units in the field starting in FY 87.

Army Corporate Database. The Army Corporate Database is a physically distributed data system which will provide the Army's comprehensive data needs in both a secure and unclassified environment. The data is an information resource to answer questions that cross functional lines and levels of command.

The effort to standardize data elements and identify one proponent for each has been revamped and accelerated to support this effort. We are continuing to develop a data encyclopedia of the standardized data elements which identifies proponent, users, and stored locations of data elements as well as their definition.

This effort will permit decision makers and action officers to do their work from an organizationally integrated perspective. Failure to fund this initiative will result in the continuing development and use of systems which only support a small community of functional users. This results in decisions based on different data and in more expense, inefficiency, and less effective decisions.

Army Supercomputer Initiative. The Army is experiencing a major shortfall in advanced computing capability to support weapons system design, modeling, and simulation requirements. With advanced technology provided by supercomputers, significant improvements can be made in developing weapons to defeat new Soviet armor, improve armaments, air defense, conventional munitions, battlefield nuclear weapons, and provide a realistic chemical defense.

The proposed solution to the requirement is to acquire supercomputers competitively. The first supercomputer configuration will serve a variety of Army users from the Ballistic

Research Laboratory, Aberdeen Proving Ground, Maryland. To satisfy priority near term requirements, an interim capability is being provided with a less capable but immediately available machine. This machine will be provided in September 1986. This contract will have an option for a second configuration. Additional configurations are programmed at the rate of one each year through the out years until Army requirements are satisfied. The estimated cost of the program is approximately $200 million through FY 91.

FORCE INTEGRATION

Army efforts to assure the effective and efficient use of resources to produce ready forces include a variety of initiatives to ensure force integration occurs smoothly. By monitoring current unit status, forecasting future readiness based on projected organizational changes and equipment distribution and merging these forecasts with a recently developed technique called Measuring Improved Capabilities of Army Forces, it is possible to predict unit capability.

Another technique integrates funding requirements for organizations with their projected status over time. To assist integration of these actions, a system of Army policies, people, computer programs, data bases, and communications will serve Army decision makers at all levels. Its central purpose is to provide decision makers current and accurate information.

In combination, these techniques are central to effective use of Army resources in the fielding and maintenance of complete, combat ready systems and organizations.

Army Modernization Training. Army Modernization Training (AMT) in FY 87 will be unprecedented in complexity and scope. The AMT program is the linchpin for the successful integration of new doctrine, organizations, and equipment in both the AC and RC. Embracing the approach to field first those units that are first to fight, synchronization of support is now the focus for AMT efforts.

The FY 87 budget adequately funds training programs for new equipment and assures the sustainment of training readiness. Program stretch-outs resulting in extended fielding will continue to present unique training challenges, particularly for the RC.

Manpower and Personnel Integration. Over the past 15 years the Army has introduced more than 400 new weapons and equipment into the inventory. Using new technologies, we have produced systems that are superbly capable. However, more needs to be done to employ technology better to improve soldier performance. We now have a solid plan to make this happen called Manpower and Personnel Integration (MANPRINT).

MANPRINT is the comprehensive technical effort to integrate the full range of human factors engineering, manpower, personnel, training, health hazard assessment, and system safety. MANPRINT is designed to ensure optimum system capability by enhancing soldier performance and reliability during material design, development, and production. While MANPRINT is concerned with the entire materiel acquisition process, its primary focus is on front end analysis to develop a clearer understanding of the potential manpower, personnel and training impacts of a proposed materiel system. Through this process, decision makers are provided information for evaluating a variety of trade-offs concerning factors such as number and quality of people, force structure, training time, technology and cost.

THE ARMY OF TOMORROW: PREPARING FOR THE TWENTY-FIRST CENTURY

The Army is committed to planning deliberately for the future and making informed decisions today to ensure that the capabilities of tomorrow's force are appropriate for executing assigned missions. To ensure that programs during the remainder of this century and in the early 21st century support consistently the fielding of necessary warfighting capabilities, the Army has developed and is using an integrated planning process with top-down guidance approved by the Army leadership.

This guidance provides consistent direction for actions necessary to meet the Army global requirements during the remainder of this century and into the 21st century. The guidance includes a logical framework for focusing Army developments, to include doctrine. The framework is derived from consideration of threats to national security, national military strategy, the requirements of the Unified and Specified Commands, and the Army's AirLand Battle doctrine.

The basic warfighting principles of AirLand Battle are not expected to experience significant change. The Army plans to continue using this doctrine during the remainder of this century and into the 21st century. Methods, procedures and techniques will be modified to keep pace with the changing threat, techniques and capabilities.

The Army has also published the first edition of Army 21 as an interim operational concept that focuses on the first 25 years of the 21st century. When review is completed, it will be used to examine how best to conceptualize combat operations in the future and develop future joint concepts with other services. Army 21 will also be available to Army laboratories and industry to focus efforts on developing technology for the future.

The essential framework for moving the Army from the present into the 21st century is described in the following vectors, critical tasks, and key operational capabilities.

VECTORS

The Army's planning process is guided by vectors which define paths that provide direction, continuity, and focus for the Army's deliberate progress from the present to the future and from planning to execution. These vectors are:

Provide quality soldiers in the Active and Reserve Components.

Fight and sustain as part of joint and combined forces.

Field a flexible, sustainable, modernized force to fight across the conflict spectrum.

Exploit operational and tactical dimensions of AirLand Battle doctrine.

Develop and exploit high technology and productivity enhancements.

Improve tactical and strategic deployability.

CRITICAL TASKS

As the Army moves along these vectors into the 21st century, it will need to perform numerous tasks. Listed below are critical tasks the Army must accomplish to enhance its warfighting capabilities and ensure its success in combat. The military application of the high technology and industrial advantages available to the United States and the melding of these advantages with the operational concepts of AirLand Battle offer the greatest potential for accomplishing these critical tasks.

The critical tasks are:

Enhance the performance of individual soldiers and battlefield leaders.

Enhance joint and combined operational capabilities.

Enhance the productivity of units.

Achieve synchronization of the battlefield.

Field a deep attack capability.

Field a capability to defeat advanced Soviet armor.

Achieve modernized battlefield sustainment capability.

KEY OPERATIONAL CAPABILITIES

It is essential that the Army focus on critical warfighting capabilities. These critical or "Key Operational Capabilities" address primarily the needs derived from the vector, "Exploit the operational and tactical dimensions of AirLand Battle doctrine." However, they support aspects of other vectors as well. The Key Operational Capabilities are constructed with objectives within each capability and tasks necessary to achieve these objectives. Achievement of these objectives and tasks in each Key Operational Capability will enable the Army to execute the defined critical tasks.

Soldier and Unit Performance Enhancement. Soldier and Unit Performance Enhancement (SUPE) objectives are to maximize soldier combat capability, improve soldier combat survivability, develop battlefield leaders and increase unit effectiveness.

Ongoing R&D programs supporting these objectives and showing high potential for achieving a leap-ahead in individual soldier performance or in unit effectiveness were selected for inclusion in the definition of SUPE. The programs were drawn from the medical and human performance work areas and include specific efforts in all four objective areas. Most elements of the program are in the early stages of research and development and all are making satisfactory progress. Five priority programs have been identified. These include research into NBC prophylaxis, leader development and selection, fatigue reversal, a training structure for large scale simulation network (SIMNET) and an integrated electronic decision support system for armored vehicles.

Reconnaissance, Surveillance, and Target Acquisition. Reconnaissance, Surveillance and Target Acquisition (RSTA) identified systems, programs and developmental challenges provide a statement of those most critical intelligence, electronic warfare (IEW), and target acquisition tasks necessary to execute the AirLand Battle doctrine. The RSTA objectives are to field an advanced order of battlefield intelligence in support of the AirLand Battle; develop enhanced munitions-vectoring capability for AirLand Battle weapons; and improve the combat effectiveness of soldiers and units engaged in IEW operations on the battlefield. These objectives will be achieved by providing adverse weather, day/night reconnaissance systems; advanced sensors capable of target detection, identification, classification, and accurate location for attack with brilliant munitions; advanced computer based techniques for automatic collection analysis; and dissemination of RSTA information. RSTA contributes to the critical task, "field deep attack capability", by producing deep reconnaissance, surveillance and target acquisition. New systems supporting the RSTA program will allow commanders to see the deep operations area without increased peril to their troops.

Command Control and Communications. The objectives for command, control and communications (C3) are threefold: to facilitate the commander's decision making process to effect a favorable battle outcome, to upgrade the continuity of C3 functions and to improve the effectiveness of all personnel involved in C3 functions.

The commander's decision making process can best be enhanced by providing highly reliable and accurate information. This will enable the commander to synchronize combat power and attack deep in an enemy's rear area as well as providing for successful counterattacks. To accomplish this synchronization, C3 will serve as a focus to develop and field a common user information management system that integrates voice, data, and image while allowing evolutionary change. This network will be secure, self-organizing, electromagnetic pulse and anti-jam protected. It will use common protocols and standards for joint, combined, and sustaining base interoperability. To assist commanders to visualize the battlefield better, know the status of weapons and support systems, and anticipate enemy intentions, the Army will develop and field an integrated battle information management system with real-time display and decision support systems.

The continuity of C3 functions will be improved by giving the commander access to long-range robust communications capability and to autonomous, as well as distributed, data bases. These data bases will allow operations with degraded communications, reconstitution, and alternate processing. Also, these information management systems will be designed with reduced electronic, visual, noise, and infrared signatures.

C3 can significantly increase the effectiveness of personnel involved in C3 functions by integrating battlefield information management systems in a vehicle with mobility equal to or greater than the maneuver element supported. These integrated information management systems will include power, antenna, and NBC protection. To minimize peace to war transition, tactical information management systems will be used in garrison as well as on the battlefield. These systems will use artificial intelligence techniques for training, troubleshooting, and fault isolation, as well as radio frequency, and general C3 planning.

Battlefield Lethality. Battlefield lethality identifies the need to develop and field advanced lethal mechanisms necessary to optimize execution of AirLand Battle doctrine. This process encompasses improved munition effectiveness, increased range and accuracy, adverse weather, day or night, obscurant-penetrating capabilities, alternative tank attack techniques, force survivability and advanced countermeasures. Priority of attention will be given to achieving the critical task of ensuring that we can defeat future advances in armored vehicles and enhancing our deep attack means. The exploitation of advanced technology, especially micro-chip circuitry, is the foundation of lethality improvements. Chemical, directed, and kinetic energy weapons are also being pursued.

Battlefield Sustainment. To provide sustainment to the Army of the future, four major objectives provide the basis for long range planning. First, prepositioned war reserve stocks must be balanced to meet the Defense Guidance. By using advanced simulation, accurate requirements for critical items will be determined. Selected critical items for modernized systems will be procured. Second, critical industrial base resources must be protected. The Army must identify shortfalls in the industrial base to support the AirLand Battle and must develop innovative means to fill equipment shortfalls rapidly in the event of mobilization. Third, the productivity of logistic support to the AirLand Battle must be increased. Life cycle costs of weapons systems must be reduced significantly. At the same time the supply, distribution, and maintenance systems must be developed systematically to be responsive and survivable from the industrial base to the battlefield. Development of advanced power generation must provide equipment with reduced signature and simplified logistical support requirements. Finally, improved battlefield casualty management must be developed to speed the return of soldiers to duty. The battlefield requires field medical units with greatly improved flexibility, mobility, and sustainability. Medical technology must be exploited to improve casualty treatment and evacuation. Taken together, these objectives provide the direction which will sustain the Army on the battlefield of tomorrow.

RESEARCH AND DEVELOPMENT

We know that future major conflict will center around land forces and will be marked by the proliferation of advanced technologies which will increase the width, depth and lethality of the battlefield. The early phases of the conflict will be critical in controlling escalation.

Investment in a strong technology base makes common sense. It gives us the institutional knowledge we need to avoid technological surprise that could cause premature weapon system obsolescence. It stimulates innovative applications of new technology, supports advanced systems concept definition, and generates the high leverage technologies of the future. In short, the basic mission of the technology base is to ensure that our soldiers continue to receive the best fighting equipment in the world and are accorded maximum protection, sustainability and supportability on the battlefield.

With congressional support, the Army has been able to maintain its commitment to a strong technology base which comprises approximately 17 percent of total Army RDTE.

A sample of our 1985 technology base accomplishments includes:

- DNA probe for rapid detection of typhoid fever.
- Completion of a basic psychological investigation explaining soldier performance in winter environments.
- Development of methods to accelerate bone regeneration.
- Demonstration of laser eye protection for the individual soldier.
- Low cost helicopter flight simulator conceptual design.
- Demonstration of an uncooled sensor array for night vision.
- Implementation of the joint service hypervelocity missile program.
- Completion of the combat vehicle armament system technology program.
- Successful flight demonstration of the Ground Launched Fiber-Optic Guided Missile.
- Demonstration of a breakthrough in caseless propellant chemistry development for small arms.

The FY 87 budget request is for a 5.5 percent growth to support exploitation of high leverage technologies, support the Army's Key Operational Capabilities and start our university research initiatives program.

Within our limited resources, we are putting our technology base effort into areas which provide the most leverage in offsetting the quantitative—and in some cases qualitative—edge of our potential adversaries. There are areas where the United States has a clear technological lead which can be exploited to increase markedly the combat effectiveness of the Army. By focusing on these areas we are accelerating the transition of high payoff technologies from industry and Army laboratories through the demonstration stage to the field. These high leverage technologies include:

- Very High Speed Integrated Circuits technology insertion which will provide compact computers and processors to enhance automatic target recognition and battlefield information management greatly.
- Advanced visible and infrared technology which will greatly improve our capabilities to detect and identify passively targets at night and during adverse weather conditions.
- Millimeter wave technology which will permit sensors to "see" and terminal homing missiles and artillery rounds to engage targets through battlefield smoke, fog, and dust.
- Research to develop chemical and biological detection systems; and vaccines, antidotes, and other compounds for prevention and treatment of casualties.
- Improved food and technology for the soldier on the integrated battlefield, e.g., lightweight mobile combat feeding system for the soldier in the field that provides high nutrition, prepackaged, labor-free hot meals for the unit on the move.
- Exploitation of computer technology through the disciplined development of software for adaptable, reliable systems.
- Computer-aided increased reliability design, materials selection, manufacturing and inspection techniques to produce much lighter weight combat vehicles for enhanced mobility that require less logistic support.

The nation's research laboratories are the birthplace for high leverage technologies. The FY 87 budget request continues the Army's research program and includes a university research initiative to create up to ten disciplinary centers for research and education. This improved interaction between academia and Army laboratory personnel will pursue two main goals:

(1) Initiate multi-disciplinary research in materials, structures, image understanding, mathematics, control systems and electro-optical signal processing; and

(2) Expand the number of U.S. graduate students and post-doctoral fellows engaged in Army-related research.

Today, the requirement to focus scarce resources to gain maximum capability is more challenging than ever. Whereas our past doctrine and procurement were oriented toward heavy forces, today we must have the capability to engage realistically threats across the full spectrum of warfare. The explosive advancement of technology, coupled with its broad application to weapons systems, makes it even more important to define requirements, develop systems and field hardware in a much shorter time cycle. The Army Materiel Command's four-year, full scale development cycle and two-year technology proof-of-principle demonstration initiatives are concrete steps to shorten this cycle.

FY 87 BUDGET OVERVIEW

We are proud of the Army's accomplishments highlighted in this statement. Our FY 87 budget request will produce further essential improvements in the Army's readiness posture ensuring an Army that is ready, responsive and responsible. To that end, the FY 87 budget request supports improvements and initiatives to enable the Army to respond fully and flexibly to divergent worldwide threats. This is not to say, however, that the budget request is a panacea. On the contrary, the FY 87 budget has been reduced $11 billion since the FY 86 President's Budget was submitted to Congress. Specific areas where the FY 87 budget falls short of our goals will be enumerated later. An examination of the budget request in terms of specific readiness objectives is provided below.

Since the Army depends heavily on people to accomplish its mission, our first objective is manning the Army with sufficient numbers of competent people. The resources requested to support the Army's manpower requirements capitalize on the near term market potential for quality recruits, and focus on trained-in-unit strength improvements. In view of the sophisticated equipment coming into the Army, the recruitment and retention of quality recruits is essential. Dollar resources are requested to support an Active Army of 780,900 soldiers, and a gradual growth in the Reserve Components. A slightly reduced civilian strength has been budgeted to support the Army.

Our second budget objective is training. The resources requested to support training will help build and sustain a flexible and ready force prepared to go to war and win. The FY 87 budget primarily builds on existing training programs, and continues several major initiatives aimed at improving the training effectiveness of today's Army. Although flying hours available for training have been constrained since FY 82, they are currently programmed to increase by approximately 100,000 hours. A continuation of 28 battalion rotations through the National Training Center is also included. Ground operating tempos for training, however, are maintained at 850 miles per combat system. With increased use of simulators, improved training opportunities exist.

Our third objective is to modernize the Army. The FY 87 Army will retain a balanced force of 28 combat divisions, 18 Active Component divisions and 10 Reserve Component divisions. In FY 87, $1.65 billion worth of equipment will be purchased for the Army National Guard and U.S. Army Reserve. However, due to funding constraints, the Army has slowed the pace of its equipment modernization program. The FY 87 budget provides a balanced approach and funds only the most critical equipment needs of the Army.

Our fourth objective addresses the need to mobilize and deploy a force of sufficient size in a timely manner to influence the early stages of conflict. Individual clothing and equipment required for mobilization training base expansion continues to be funded in FY 87, moving the Army gradually toward the capability to outfit all of its trainees during the first 90 days of mobilization. However, the FY 87 budget decreases the growth rate of the war reserve stocks by 43.8 percent below the FY 86 rate. Peacetime operating spares decrease by $87.3 million in FY 87 to $1,815.9 million. The FY 87 budget also includes funding for layaway and maintenance of reserve standby industrial facilities which are critical to wartime production.

Finally, we are continuing the progress toward improving the quality of life for our soldiers and their families. Quality of life issues have a direct impact on readiness and on the commitment of soldiers to an Army career. Quality of life categories include housing, both barracks and family quarters; facilities operations and maintenance; education opportunities; family and religious needs; community, morale and welfare, and recreation services; and health care facilities. The FY 87 budget includes funding for barracks construction and renovation, and facilities maintenance projects, especially in Europe. The FY 87 request for quality of life issues includes an increase of $320 million over the FY 86 request. Furthermore, this level of funding fully finances annual maintenance and repair requirements, and provides funds for an estimated 7 percent decrease in Backlog of Maintenance and Repair.

The Army, however, is concerned about the erratic and inconsistent levels of funding of its programs. Large changes in funding complicate the efforts of the Army to provide a consistent and steady program. Unforeseen decrements to the funding posture hinder the efforts of the Army to plan effectively and implement programs requiring long lead times, multiyear contracts and other cost containment efforts. It also increases the cost of the items purchased.

APPROPRIATION OVERVIEW

The FY 87 budget requests $80.6 billion in Total Obligation Authority (TOA), with outlays of $78.3 billion. The following table shows the FY 87 request in terms of current and constant dollars in comparison with FY 85 and FY 86.

FY 85 totals represent actual obligations and expenditures. FY 86 data represents the current year budget as appropriated by Congress.

($ IN BILLIONS)

CURRENT DOLLARS

	FY 85	FY 86	FY 87
TOA	73.5	77.9	80.6
OUTLAYS	66.7	76.1	78.3

CONSTANT FY 87 DOLLARS

	FY 85	FY 86	REAL GROWTH FY 87
TOA	77.7	79.7	80.6
OUTLAYS	70.5	77.9	78.3

Figure 5.1

ARMY BUDGET MIX

The cost of maintaining the Army falls under three major categories: (1) Operation and Maintenance, (2) Military Personnel, and (3) Investment accounts.

Operation and Maintenance accounts have remained constant between FY 86 and FY 87 at 31 percent of the budget, with a total of $25.2 billion in FY 87.

The Military Personnel category contains $28.6 billion in Total Obligation Authority. The Military Personnel accounts have remained constant in the Army budget at 36 percent for both FY 86 and FY 87.

The Investment accounts contain $26.8 billion and represents 33 percent of the budget, the same as in FY 86.

BUDGET HIGHLIGHTS

- Maintains level Active Component strength and reflects a slight reduction in civilian strength.
- Accelerates U.S. Army Reserve Paid Drill Strength, capitalizing on near term market potential for quality recruits; and focuses on trained-in-unit strength improvement.
- Supports light infantry division initiatives to include divisions at Forts Drum and Wainwright.
- Funds 94.5 percent of depot maintenance.
- Promotes efficiency through automation.
- Increases quality of life.
- Maintains operating tempo of training at acceptable level.
- Slows our improvement in wartime sustainability.
- Improves security against terrorist activity.
- Provides new forward area air defense program.
- Slows procurement program.
- Meets requirements for weapon systems fielding.
- Funds equipment for:

  14 Abrams tank battalions
  11 Bradley battalion equivalents
  7 Apache Attack Helicopter battalions
  3 Black Hawk helicopter company equivalents
  3 medium helicopter transport companies (CH-47D)
  4 MLRS batteries
  12 Patriot batteries

- Improves lightweight mobile combat feeding system for the soldier.
- Increases development of advanced missile and infrared technology.
- Improves integrated circuits technology for automatic target recognition and battlefield information management.
- Builds 108 mobile home sites.
- Constructs 3,412 new family dwelling units (including 120 attic units):
- 2,608 units in CONUS.
- 668 manufactured units in Europe.
- 136 other.
- Upgrades 1,359 substandard housing units into 1,124 adequate units.
- Improves energy efficiency in over 11,887 units.
- Provides whole house renewal for 2,520 units.

RECOGNITION OF SECRETARY MARSH

Senator STEVENS. Thank you, General. We are delighted to see one of our leaders here. I know he has a busy day.

Senator Byrd, I will be glad to yield you my time and get back on the schedule later so that you may participate.

Senator BYRD. Thank you, Mr. Chairman.

I do not wish to impinge on the time of the Chairman and other members. If I could just state to Secretary Marsh that I am delighted to see him here at the committee meeting this morning. We have met from time to time and have discussed possible expansion of the Army's presence in West Virginia. Just now I would be content with asking one or two questions, Mr. Chairman.

ARMY PLAN FOR WEST VIRGINIA

Secretary Marsh, what are the Army's plans which will result in an increased presence in West Virginia in both the Regular and Reserve Guard components?

Second, if I might ask, what is the status of the super computer complex that I have proposed to be located, hopefully, in Morgantown in cooperation with West Virginia University.

Secretary MARSH. Senator, as you recall when we met, you pointed out several times, the possibilities in your State of a series of different things that would involve both the Active and Reserve component.

In reference to the Active Component, one of the first things we discussed was upgrading Camp Dawson which has a particular potential for use that relates, not unlike some of the things we are talking about, to special operations types of forces.

There were several other areas that we spoke about, particularly of note were the National Guard and Reserve expansions. Some of those related to Army projects for the Guard and Reserve centers.

I will be glad to incorporate and place in the record a list of those things we cited to you at that time, both Active and Reserve, that we could do and those under study.

[The information follows:]

WEST VIRGINIA STUDY

The Army is planning the following actions that will impact on the state of West Virginia:

—Accelerating MCA Camp Dawson project ($8.9M) from FY 88 to FY 87 program.

—Accelerating two of four MCAR projects in WV: New Martinsville ($1.3M) from FY 89 to FY 88; and Parkersburg ($1.5M) from FY 90 to FY 89.

—Accelerating six of nine MCARNG projects in WV: Pt Pleasant ($0.9M), Kingwood ($0.7M) and Cp Dawson Phase II ($1.1M) from FY 89 to FY 88; Cp Dawson Phase III ($1.1M) from FY 90 to FY 88; Cp Dawson Phase IV ($1.1M) from FY 91 to FY 89; and Cp Dawson Phase V ($0.7M) from FY 92 to FY 90.

—Stationing 3d Bde (-) 80th Tng Div (USAR) with two battalions in WV vice Virginia. Accelerate 3d Bde (-) activation from FY 89 to FY 88. Existing battalion (1-320) will remain at Ft Belvoir.

—Stationing a USAR Light Equipment Maintenance Company in WV as an FY 88 activation.

—Stationing a USAR Ground Ambulance Company in WV as an FY 88 activation.
—Stationing a USAR MI Company in WV as an FY 89 activation.
—Stationing two ARNG Air Ambulance Detachments in WV as FY 89 activations.
—Further studying relocating an active MI Battalion (-) to WV.

SUPER COMPUTER

Secretary Marsh, second, you ask about the super computer. I explained to you at that time, Mr. Ambrose, the Under Secretary of the Army, who is an expert in this field, was pulling together a study on that. I have been advised that Mr. Ambrose would be available to see you and discuss with you the results of that study. I feel very hopeful about that, sir.

Senator BYRD. I want to express appreciation to you, Mr. Secretary, for the consideration you have been giving to the questions I have raised with respect to increasing the Army's visibility and presence in West Virginia.

AVIATION CAPABILITIES AT MARTINSBURG, WV

Secretary MARSH. Senator, if I could add, there were several areas that were of special interest that related to aviation capabilities at Martinsburg, WV. Also there were aviation assets in certain other areas of the State that were very attractive.

I have not had an opportunity to discuss personally with Mr. Ambrose the results of his study. I know he has been diligent in pursuing it and I know he is the person who figures out how to do things rather than figuring out how not to do things.

Senator BYRD. May I say West Virginia has a great deal to offer and I think it will be beneficial not only to West Virginia, but I think also to the Army to continue pressing for additional presence of the Army in West Virginia.

I will be looking forward to the list that you indicated you would supply for the record and also look forward to talking with Mr. Ambrose regarding the plans he might have.

Secretary MARSH. I will ask Mr. Ambrose to arrange an appointment with you, sir.

Senator BYRD. Fine.

Mr. Chairman, thank you very much. I will submit other questions for the Secretary.

Senator STEVENS. Thank you. It is good to have you here.

Senator Proxmire.

AREAS OF ARMY CUTS UNDER GRH

Senator PROXMIRE. Thank you, Mr. Chairman. Secretary Marsh, I want to ask you the same question I asked the Secretary of the Air Force and the Navy.

If the Gramm-Rudman sequester order goes into effect, it means the Department of Defense may be cut $49 billion in budget authority. The Army share of that would be as much as $12 billion.

How would the Army absorb that cut? I would like to have it as specific as possible and also tell me what effect this cut will have on the Army capability to fulfill its national security obligations.

EFFECTS OF GRAMM-RUDMAN

Secretary MARSH. Senator, I will say to you that the budget that has been submitted does not envision a triggering of Gramm-Rudman. Your question is in the event it does trigger, what happens then?

Senator PROXMIRE. Right.

Secretary MARSH. Naturally, we would want to do everything we could to avoid that contingency. Based on extrapolation and hypothesis, and General Wickham had some figures pulled together that related to impacts, but to summarize them, they will have a very devastating impact. There would not be any discretion where the cuts will occur which means you will have to take the cuts across the board.

The Army has a budget of approximately 1,400 accounts, as I recall, which means that you would take an equal decrement on a percentage basis in all accounts without any discretion. Our problem is compounded because we are very personnel-intensive.

Consequently, you would have an enormous impact on the Army personnel account, not just in the active force, but also in the National Guard and in the Reserves.

General Wickham may want to add to some of those statistics.

GRH EFFECT ON NATIONAL SECURITY OBLIGATIONS

Senator PROXMIRE. Can you tell me or characterize somehow how this will affect the Army's capability to fulfill its national security obligations? You said it would be devastating.

Secretary MARSH. It would be devastating. The personnel drawdowns that would be required could not be achieved, in my view, without inactivation of significant combat units.

Senator PROXMIRE. Do you think this would have a serious effect on our national security?

Secretary MARSH. Yes, I do.

General WICKHAM. Of course, it depends on the level of deficit reduction we have to absorb and the level of outlays we have to absorb. This view takes into consideration a median range level of outlay reduction.

PERSONNEL CUTS UNDER GRH

Since there is no flexibility, we must take it evenly in personnel accounts as well as others. In the personnel account we might lose over 100,000 soldiers in 1987 which would include something on the order of 20 to 25 percent of our officer corps, 10 percent of our non-commissioned officer corps. That is about a half million years of experience gone. Furthermore, to achieve this level of reduction means we probably are going to have to inactivate four divisions.

Senator PROXMIRE. You would have to deactivate?

General WICKHAM. This means we would inactivate four active divisions.

Senator PROXMIRE. How many divisions do you have?

General WICKHAM. With the activation of the 6th Division, we will have 18. Therefore, you see it does impact our ability to fulfill our worldwide missions.

Secretary MARSH. Sir, I am referring to the deficit of the type you cite. You said 49 billion.

GUARD PERFORMANCE IN EUROPEAN EXERCISES

Senator PROXMIRE. You said it was. I understand that our Guard units for Air Force and Army performed extremely well in Europe. General Matera was delighted with the exercises. Individuals from the press that accompanied that trip to Germany were disappointed because many ground exercises were called off and some people sat around for days with nothing to do.

What concerns me is that it would seem in the wintertime when you would expect bad weather, that there weren't options for the troops to be active and to have some kind of constructive experience other than moving equipment there and being on the spot.

We do not postpone football games no matter how bad the weather is. It seems to me to postpone a war exercise is hard to understand.

CANCELLATION OF REFORGER ACTIVITIES

Secretary MARSH. One of the reasons winter is selected is we hope that bad weather would be helpful with the associated frozen ground, which enables us to use track vehicles to move around the countryside.

However, I went over with the elements of your National Guard and I was with them in the field. We had a situation there where the tanks were in mud up over their tracks, and you could not move them because of that kind of condition.

Senator PROXMIRE. What would happen in actual combat?

Secretary MARSH. In combat you would continue to move over the hard surface roads, Senator, but you had a situation there where there was so much heavy armor involved, the amount of damage to move like you would in a combat situation would be extremely harmful. If you had very frozen ground as we usually expect there, the exercise goes on and you move over the broad countryside.

Unfortunately, this year that was not the case. In this situation what they did as soon as it became apparent that they could not continue to exercise, was move the First Division that had deployed to Europe, and the 32nd Brigade with their supporting units from Wisconsin. They were moved to Grafenwoehr or Hohenfels, two of our German training bases, where they could engage in normal type of training activities in order to take up the slack that occurred in the schedule.

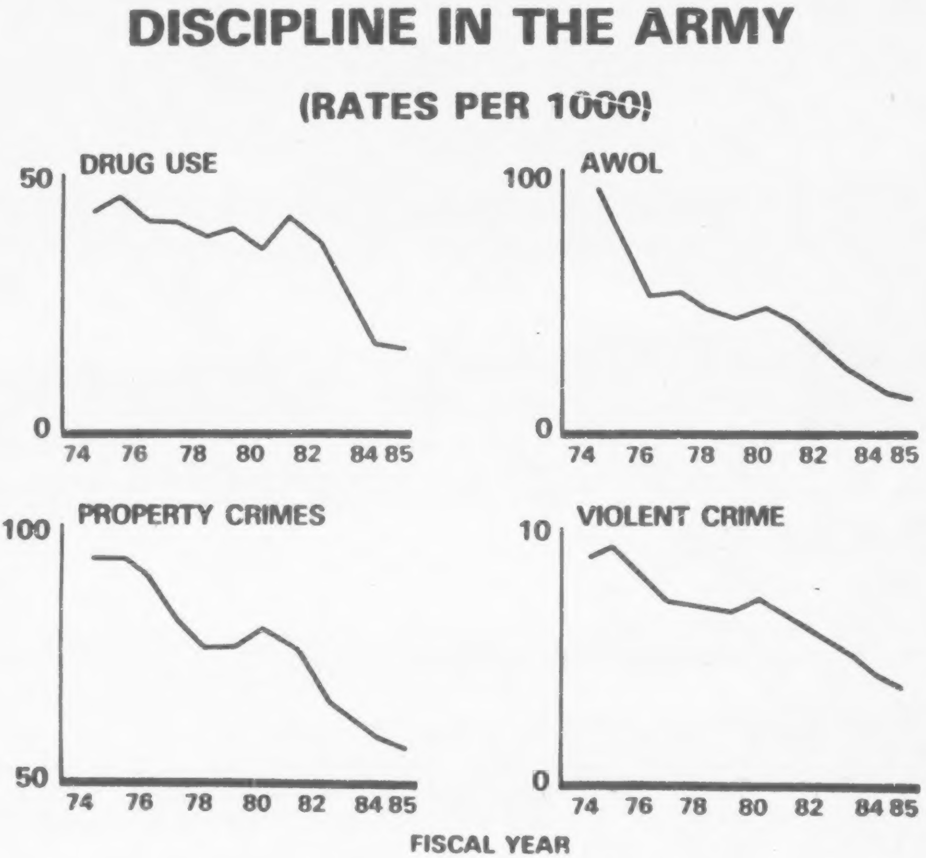
IMPROVEMENT IN DISCIPLINARY FACTORS

Senator PROXMIRE. General Wickham, you had a number of slides. It is hard to believe these figures with respect to discipline in the Army. I notice you have drug use going from 50 per thousand down to 10 or 15. You have AWOL dropping from 100 per thousand down to less than that. You have property claims dropping in the same proportion. Violent crimes dropping, too.

If these were in the private sector, I would not believe them. It is so easy to manipulate figures. It seems to me it must be absolutely honest.

How do you explain this? I am amazed. Most of the improvement takes place in the period of the last 3 or 4 years.

How do you explain that remarkable change, a drop of 90 percent in drug use, a drop in AWOL's?



INDISCIPLINE INDICATORS

General WICKHAM. You are right and these indiscipline figures are accurate data. They are the corollary of the quality of people we have recruited for the Army, 91 percent have high school diplomas, the top mental category I through IIIA is 63 percent. They are achievers and there is good leadership in the Army.

I think also there is an increased emphasis on values and discipline within the Army. Taking care of families makes soldiers feel better about ~~the Army.~~ Half of the Army is married, 54 percent; over half of the wives work; and there are over 700,000 children, half under the age of six. By taking care of the families you make soldiers feel better about the Army.

REDUCTION IN DRUG USE

The drug issue you speak to is an interesting one. We do have random urinalysis now and it is so accurate that it can detect marijuana exposure in the past month. Since the testing is random and can be done quickly, it offers a deterrent effect.

The Army has also tried to deglamorize alcohol abuse as well as drug abuse. We have very strict rules in the Army about DWI and drug abuse, all of which leads to a fitter Army that feels better about itself. Those statistics you have seen are part and parcel of that.

Senator BYRD. Mr. Chairman, could I ask if the Secretary would place in the record some of the raw material on which these graphs are based so that we know what we are using as the basic figures and facts?

Secretary MARSH. I will be happy to, Senator. Incidentally, the urinalysis testing shows the use of marijuana in the last 6 months is only 5.2 per thousand.

Senator BYRD. You have not changed the standards or any of the factors on which——

AWOL AND DESERTION RATE

Secretary MARSH. No. As a matter of fact for the AWOL and desertion rate, we have no statistics in the history of the Army that show them lower than that.

General WICKHAM. The same data base applies. We have not changed anything.

Senator BYRD. Would you provide for the record the apples that are being used against the apples that were used in 1974?

General WICKHAM. Yes sir.

[The information follows:]

INDISCIPLINE FACTORS

The following are number of incidents used to determine rates per 1,000 for indiscipline in the Army.

	Fiscal year—	
Number of incidents	1974	1985
Violent crime	6,350	2,677
Crimes against property	71,796	44,057
AWOL	60,019	8,886
Desertion	27,788	4,357

RESULTS OF GRH ON WEST VIRGINIA GUARD AND RESERVE

Senator Byrd. When you spoke of Gramm-Rudman and the impact it would have on the reserve and the Guard units, would you supply for the record the results of Gramm-Rudman, particularly with respect to the October 1 sequestration?

Supply what the result would be in West Virginia on both the regular and reserve guard components. Perhaps Senator Proxmire would like the same for Wisconsin. He could speak for himself.

[The information follows:]

Results of Gramm-Rudman-Hollings, 1 Oct. 86 Sequestration

If we assume a hypothetical situation whereby the Gramm-Rudman-Hollings law would trigger sequestration at a 9 percent rate for FY 87 the impact on the Army would be the loss of over 100,000 active and approximately 50,000 Reserve Component [RC] personnel. This is the equivalent number of personnel to man 4 active and 2 RC divisions. The decision has not been made as to how this reduction will be applied. Therefore, the impact on individual states cannot be quantified. In FY 86 we had some flexibility in where we took reductions and were able to protect our vital force structure. If sequestration of this magnitude becomes a reality in FY 87 and Congress provides us the same flexibility as it did in FY 86 the impact on our military personnel will be alleviated.

EFFECTS OF GRAMM-RUDMAN

Secretary Marsh. It would have to be based on a hypothetical situation. The statistics that Senator Proxmire was using were $49 billion, and as I said, we would hope that would not occur.

Senator Stevens. This is such an iffy thing. I do not know how you can give details of what could happen to Wisconsin or Louisiana or which is based on sequestration order. You cannot predict what Congress can do in the first place.

So, the sequestration order will apply after Congress makes its judgment.

Senator Rudman.

EFFECT ON ARMED SERVICES FROM DECLINING ECONOMY

Senator Rudman. Thank you very much, Mr. Chairman.

I would probably rephrase the question of my friend from West Virginia, my friend from Wisconsin, and my friend from Louisiana. I would put it this way:

What would the result be on our States if the Congress and the administration totally avoid, evade and walk away from our responsibility to preserve America's freedom, necessary social programs, and a balanced economy? That is really the question. I want to say to you what I said to the Chief of Staff of the Air Force and Chief of Naval Operations.

History teaches us that the greatest threat to the Armed Services is what happens to their budget when the economy declines. General Wickham graduated from the Military Academy in 1950; anyone who has been in the Service for that length of time recognizes this.

You had a wonderful chart that showed an extraordinary negative growth for 1987. I would simply submit to you both that with the Government's interest payments approaching $300 billion more than the defense budget of this year in the 1988–89 time frame you can tell where we are heading.

I hope that Gramm-Rudman does not get imposed. I hope Congress does what we are supposed to do. I always thought we were elected to make decisions, not to hide. We will have to find out who wants to hide and who wants to vote.

The first question is for you, General Wickham. I find it very interesting that you talked about an option in your discussion on modernization of the helicopter fleet.

I want you to discuss this at some length. It is an enormous amount of money for the next decade, but we ought to spend it wisely even if this means spending more to do the right thing and choosing between modernization of Black Hawk AH–64 versus going ahead with the LHX.

You alluded to this option in your comments. This is the first I have heard you say anything about it publicly.

HELICOPTER MODERNIZATION EFFORTS

General WICKHAM. We have underway a cost and operational effectiveness analysis looking at alternatives to the LHX program. One alternative that is being looked at is continuing the buy of Apaches and continuing to buy Black Hawks, and perhaps developing the AHIP, the small, upgraded Scout helicopter, to replace the helicopters that we have in the system.

Regardless of whether we go with LHX or go with the alternatives I mentioned, it is still going to be expensive because we have to buy airframes to replace the UH–1's and the OH–58's that are going out.

Senator RUDMAN. About 600 aircraft?

General WICKHAM. It is probably in the neighborhood of 5,000 aircraft.

Senator RUDMAN. 600 aircraft in the first shot. We are talking about $40 billion.

General WICKHAM. For LHX we are talking around $40 billion to upgrade 5,000 helicopters. If we go with an alternative, it will be less than that, but not substantially less. The issue for us now is do we modernize the helicopter fleet in some way, and either use leap-ahead technology or older existing technology. It will be expensive either way. We have to do that and if we do not, we will have a helicopter fleet in the Army that will be on the average of 30 years of age in the mid-1990's.

Senator RUDMAN. I agree that the Army has to replace its helicopter fleet. Many of us who have flown in helicopters around the world recognize that. When will the Army have an intensive analysis of the cost of upgrading and the performance falloff in comparison with brand new technology for this committee and Congress?

Obviously, if it is a matter of a few percent, I think I would know how I would vote. If it is an enormous amount of money in these budgetary times, we will have to look into it again.

When will you have information for us?

General WICKHAM. The cost and operational effectiveness analysis should be done later this year. The only money that we have now is for research and development of the LHX which can be applicable across the board for the modern technology engine. This R&D will enable us to determine whether a single pilot can fly an aircraft with a heads-up display, utilizing voice-actuated composite technology in the airframe.

MAINTAINABILITY OF HELICOPTERS

One of the real trade-offs in terms of the leap ahead technology is in the maintainability of helicopters. Right now it is very expensive in terms of hours you have to put in. One of the goals of the LHX is to cut it in half. We think we can do that. So, there is a promise here of great opportunity and the issue is whether we want to modernize or not.

Senator RUDMAN. General Wickham, it seems to me at least that this is an issue where we ought to try to work together. One of the things that disturbs me is we sometimes develop an adversarial relationship, not necessarily with this committee, but with the Congress.

When we get into unintellectual, worthless public statements such as in this one, modernization would cost half of what replacement would cost. Nobody talks about maintainability, life cycle cost, capability, or durability. I would hope that before this thing gets out of hand, just looking at upgraded AH–64's and Black Hawk compared to the technology I am aware of in LHX, there is probably substantial cost difference which might be very illusory.

I would hope the Army will do a good job with Congress so we know early on what the choices are and we can look at the apples and apples instead of apples and bananas. I just want to emphasize that I think one of the most important things the Army can do in this program is make sure we have real figures that we can understand so we can make some intelligent choices this year and next.

Senator STEVENS. It is my understanding the Senator from New York wants to put a statement in the record.

PREPARED STATEMENT

Senator D'AMATO. I would like to say hello to Secretary Marsh and General Wickham and say I am extremely pleased with the direction I see our Army moving in. I think you have done an outstanding job.

I would like to submit the balance of my remarks for the record.

[The statement follows:]

PREPARED STATEMENT OF HON. ALFONSE D'AMATO

U.S. SENATOR FROM NEW YORK

Mr. Chairman, I want to welcome Secretary of the Army John Marsh and Gen. John Wickham before this subcommittee. I commend both Secretary Marsh and General Wickham for their fine stewardship over the modernization of our Army during the past 5 years.

By 1980, the state of our fighting forces and the morale of our troops had become very low. However, strong leadership, provided primarily by President Reagan and reinforced by gentlemen such as yourselves, has revitalized our Armed Forces. This revitalization has overcome many obstacles, but many more obstacles still await us.

One major roadblock will be the need to reduce our budget deficit and adhere to the Gramm-Rudman-Hollings Deficit Reduction Act. It is possible that the Defense budget may be reduced by close to $50 billion automatically in fiscal year 1987.

For fiscal year 1987, the Army has requested $81.5 billion in new budget authority. This is an increase of 12.6 percent over the $72.4 billion of new budget authority the Army will have this fiscal year after the automatic Gramm/Rudman cuts are made. It is my hope, however, that the automatic reductions built into Gramm-Rudman-Hollings will not have to be used in 1987; it would be much better if we can meet our deficit target in a more responsible fashion.

Each service has undertaken ambitious projects and set lofty goals for the readiness and modernization of its forces. Although the most likely threats to U.S. security are at the lower end of the spectrum of conflict, the primary threat to our national security remains the Soviet Union's expanding military influence. The Soviets have supplied more military equipment to third world nations than any other country, and they continue to equip and train surrogate forces around the world.

To help meet this challenge, the Army undertook a program to achieve a proper balance of heavy and light forces. Part of this modernization effort resulted in the creation of the Light Infantry Division.

With the Light Infantry Division initiative, the Army is increasing its strategic flexibility. Modernization of light forces is essential for readiness to respond to a broad spectrum of threats. These forces will be able to deploy roughly three times faster than the standard infantry division, increasing the Army deterent and war fighting capabilities.

The 10th Mountain Light Infantry Division will be located in upstate New York at Fort Drum. Another Light Division will be located in my distinguished chairman's home State of Alaska. The decision to station the 10th Mountain Division at Fort Drum transcends political boundaries. Since the Army has not had a major contingent of combat troops in the Northeast since the Korean War, the placement of these troops at Fort Drum is vital to our national security interests. I highly commend Secretary Marsh and General Wickham for their foresight and courage to establish the Light Infantry Division.

I am confident that the Army will continue to meet the challenge of the explosive growth in Soviet ground forces. I look forward to working with you, Mr. Secretary, and General Wickham as we complete the Army's strategic modernization program.

Thank you, Mr. Chairman.

ARMY CHANGES

Senator STEVENS. I am interested in your presentation. I, too, join the other Senators in commending you for the staggering statistics that you have brought forward concerning the change in the Army. We have several people here who have served in the Army.

One of our experts on the budget matter is, of course, a former company commander, as you know, in Korea and he keeps us straight about the current plans in the Army. I have to tell you I am not worried about the Army after the sequestration because I just do not think it can happen.

We will make the cuts in the Department of Defense that are necessary to get us to the target level. If the other subcommittees do their part, we are not going to see any massive problem develop and there should not be.

REDUCTION IN OIL PRICES

As a matter of fact, Mr. Secretary, I have not asked yet, but isn't this reduction in oil prices going to have a substantial impact on your budget? Aren't you fuel intensive in your maneuvers and total operation?

Secretary MARSH. A reduction in oil production prices will undoubtedly have a significant impact in reducing our operational costs.

Senator STEVENS. How will that affect your budget?

Secretary MARSH. The effect will be defense-wide because fuel is bought by defense contract. They do the purchasing for us, but we could expect a reduction to be passed on to us.

Senator STEVENS. When I was in Great Britain 10 days ago, one of the officials of a major energy company said be prepared for $5 price of oil a year from now. If that is true, a lot of the cost associated with the Department of Defense will be substantially reduced. Being from where I am from, I do not like to anticipate that it will happen. There are many uncertainties ahead of us in terms of this budget.

POST DIVAD AIR DEFENSE MASTER PLAN

The best thing we can do is go day by day and plan to maintain the defense of this country. One of the things I am worried about is the "Post DIVAD Air Defense Master Plan." I understand you have a new five-part plan for modernization of the forward air defense and DIVAD alternatives. This is an interesting concept.

We realized the termination of DIVAD was going to give you a difficult problem and, as you know, responded to your request and insisted on $150 million in this 1986 budget for this follow-on system.

Your budget requests $9.1 million for "air defense systems heavy." We do not know how that relates to DIVAD. I would appreciate, first, if you can comment on this five-part plan. I assume, Mr. Secretary, it has had your approval. If that is the case, the General, I think, can outline it for us.

AIR DEFENSE DEVELOPMENT INITIATIVES

General WICKHAM. We are talking about building air defense capability in the Army in the near term. We will use the existing Command and Control and Intelligence system, older SHORAD C2I system. We need a non-line of sight air defense missile system developed.

One of the things that has come out of the analysis is the fact that the hovering helicopter is a greater threat than we ever thought before, a truly hovering helicopter that can hover outside the line of sight or range of our maneuver forces behind a hill, pop up, and fire and forget a missile at a target. How can you kill that helicopter? Line of sight guns cannot find and kill him and fixed wing aircraft have difficulty killing him. We have developed a fiber optic system that will reach out to extended ranges with a relatively inexpensive missile and it will kill that helicopter. We have already demonstrated that capability.

Senator STEVENS. Is that FOG–M?

General WICKHAM. Yes.

Senator STEVENS. How does that relate to ground AMRAAM?

AMRAAM MISSILE

General WICKHAM. The AMRAAM missile system's cost is in the hundreds of thousands of dollars range and it is a heavy missile. We are looking at a ground-launched AMRAAM as a possibility.

The FOG–M, we are talking of a missile that costs under $50,000. You do not destroy the sensing and controlling mechanism as it is located in the firing vehicle. You are looking out of the television camera in the front of the missile and you can actually fly it down a road and if you see a tank you want to kill, you can lock on it and do so.

For the non-line-of-sight missile system we would go out to industry and say here are the specs and you come back to us with your capability to build it.

LINE-OF-SIGHT SYSTEM

For a line-of-sight system, we are going out to industry and saying we want a non-developmental initiative, what does industry have, and then get a shoot-off back from industry. There are a number of options out there, foreign as well as domestic to build a capable, gun-missile mixed weapons system to kill hovering helicopters in the forward area.

The last possibility is a very interesting one and Senator Rudman has had a lot of discussion with us about this. There are already capabilities extant in the Army that can be used with some augmentation to make more capable the combined arms capability to kill both fast and slow moving aircraft.

BRADLEY FIGHTING VEHICLE

The Bradley Fighting Vehicle has a very effective bushmaster cannon on it, and with a small amount of improvement, not every one, but maybe with one out of five, we can add more capability in terms of guns to drive aircraft up.

We can also add to the tank gunnery. Tanks can kill a helicopter. In fact, in gunnery competition they have to train to shoot down helicopters and product improved ammunition will help. All of this will lead to an improved capability to provide for forward area air defense as well as rear area air defense.

MK-15 IFF SYSTEM

Senator STEVENS. What about your need for a new IFF if you are going to proceed with this forward air defense command and control concept.

Are you working on that?

General WICKHAM. Yes, sir, with the services and with the allies, the MK–XV IFF system—Identification Friend or Foe—is tied in with the command and control communications, sensors, and interrogators. We are looking for a passive interrogator.

Senator ANDREWS. Mr. Chairman, I have to go over to meet with Senator Dole. Could I include some questions for the record? I do not want to take the time of the committee at this time.

Senator STEVENS. Yes, sir. You do not mind if I put a 2-hour limitation on them?

Senator ANDREWS. Not at all. Mine are short and to the point. I am sure we will get short, incisive and frank answers.

BRADLEY FIGHTING VEHICLE TEST RESULTS

Senator STEVENS. The Bradley Fighting Vehicle, you mentioned that. There is no question it is going to be one of our chief issues this year. This is something I think that we may have to have one hearing on it alone before we are through this year.

As I understand, you have had some results from the live fire survivability tests.

Could you summarize those for us today.

General WICKHAM. Yes, sir.

WHAT WE LEARNED

- JET IMPACT ON AMMUNITION MAJOR HAZARD TO VEHICLE AND CREW
- AUTOMATIC FIRE SUPPRESSION SYSTEM EFFECTIVE IN EXTINGUISHING FUEL FIRES
- LITTLE EFFECT ON VEHICLE OR CREW DUE TO OVERPRESSURE AND TEMPERATURE (VAPORIFIC EFFECT)
- PREVENTION OF PENETRATION AND SPALL WILL REDUCE VEHICLE DAMAGE AND CASUALTIES
- SPALL HAS MINIMAL EFFECT ON AMMUNITION DUE TO AMMUNITION PACKAGING
- SECONDARY FIRES UNLIKELY

SURVIVABILITY CAN BE IMPROVED

This chart shows the testing proved to us some very obvious things. For example, we can suppress the vehicle fires, the halon system in it worked very effectively. We found that the so-called vaporific effect does not really work with the vehicle armor, but we did find that we need to put a spall liner in it, such as a Kevlar liner to minimize any kind of metal that will fly around as splinters.

We also discovered the need to rearrange the ammunition inside of it and also the threat of secondary fires may not be a major problem. Solutions to this are basically rearrangement of ammunition stores; some protection of the fire-suppressant lines; a spall liner; and installation of reactive armor outside of the vehicle.

All modern armies are now putting reactive armor on the outside of their lightly skinned vehicles. We think the cost of these product improvements will not exceed $81,000 per vehicle. A relatively modest investment.

We always product-improve vehicles based on evolution of the threat, both in terms also of their capabilities and that is what is involved here.

INSENSITIVE AMMUNITIONS

Senator STEVENS. We are led to believe that the Navy is doing a lot of research on what is known as insensitive ammunitions. This comes about because of the problem of shells penetrating a vessel's ammunition magazine.

Have you used any of the so-called insensitive munitions in terms of your test on the Bradley vehicle? It is possible you might go to a generation of weapons of ammunition that will be similar to that.

General WICKHAM. Let me provide an answer for the record on that, sir. We may be into a classified area.

[The information follows:]

INSENSITIVE AMMUNITION TESTS

The Army did not incorporate insensitive munitions in the Bradley Fighting Vehicle [BFV] Joint Live Fire Test Program because such munitions are not yet available. The Army is currently exploring the application of less sensitive propellants in the 25mm ammunition and TOW 2 missile. A research and development [R&D] program is being accelerated to incorporate Low Vulnerability Ammunition [LOVA] propellant in the 25mm. LOVA is insensitive to spall. For the TOW 2B, there is an ongoing plan to replace the current flight motor propellant with a less sensitive propellant. The Amy is planning to accelerate this program also. The goal is to develop less sensitive munitions within the next three years.

Senator STEVENS. Thank you very much. I will be back later.

Senator Johnston.

IMPROVEMENT IN LEVEL OF DISCIPLINE

Senator JOHNSTON. Mr. Chairman, I am not surprised by the chart showing the great leap forward by the Army because that coincides with what I have seen on my visits to Fort Polk. The level of discipline has palpably improved.

It is remarkable the job that the Army has done. It is a real pleasure to go and see the fighting men we have today. They are really good in terms of discipline, in terms of what they are able to demonstrate to me. I am not at all surprised that you have had this remarkable progress. I think you are entitled to be congratulated for what you have done.

I want to also congratulate you for including in this year's budget the tank ranges at Fort Polk. Those will be greatly needed with the new M1 tank.

On RDX, could you give us a letter outlining what your plans are and specifically when you propose to begin construction of that facility?

ARMS CONTROL INITIATIVES

Secretary MARSH. Senator, there is a letter on our Research Department explosive/high melt explosive plans now being coordinated at the Office of the Secretary of Defense, which we should be able to get over to you very shortly.

[The information follows:]

RDX/HMX

The Army plans to design a 2.5 million pound per month RDX plant and site adapt it for Louisiana AAP utilizing apropriated FY 1984 funds of $19.5 million and fiscal year 1985 funds of $10.0 million. Site work at Louisiana would include topography examination, soil borings, design of bridges, roads and water supplies. The physical construction of the RDX plant at Louisiana AAP is programmed to begin in Fiscal Year 1988.

NATO FORCES FACING SOVIET DIVISIONS

Senator JOHNSTON. Very good.

In your statement, General Wickham, you point out that the Soviets have 199 divisions now. What is the comparable figure for NATO facing these 199 divisions?

First of all, let me say how much of the 199 are Warsaw Pact.

Secretary MARSH. The Soviets currently have dedicated to the Warsaw Pact 70 divisions which include their own 40-plus divisions. Another third of the Soviet force is stationed along the China border. Not all of those Soviet 199 divisions are directed toward NATO and neither are all of the 199 divisions of equal capability.

The number of forces in the NATO Alliance I think numbers around 600,000 now. I can give you more precise details on that for the record, Senator.

NATO MILITARY COMPARISON TO WARSAW PACT FORCES

Senator JOHNSTON. What I have in mind is this. The Soviets are submitting to us an arms control proposal involving the elimination of nuclear weapons by the turn of the century. We have spoken of the same goal and we speak of this goal as if it is something that we really want to do.

Frankly, I never had thought it made any sense to eliminate nuclear weapons altogether particularly unless we are willing to match the Soviets in conventional weapons, certainly in Western Europe, or unless we can get the Soviet Union to reduce their conventional forces down to that which we have.

So, in the context of that question, let me ask: Are we equal to the Soviets? First of all, in Warsaw Pact in conventional weapons?

Secretary MARSH. I am going to defer the specifics of your question to General Wickham, but I would make this observation.

When you look at Western Europe, you cannot look at it simply as United States forces versus Soviets. Our allies make a very significant contribution in many different ways in land forces and in deterrence. I will also say to you that to succeed an attacking force usually has to enjoy a very significant numerical advantage. When you look at the numbers of roughly 600,000 in the NATO force and 700,000 in the Warsaw Pact, I think the numbers point to deterrence of conventional attack.

I will say to you that it is important to continue with the modernization programs in all of the NATO armies and that we continue to build our prepositioned stocks of war supplies in order to make that deterrent credible.

General Wickham may want to speak to some of the levels of our forces versus Soviets.

SOVIET SUPERIORITY IN CONVENTIONAL WEAPONRY

General WICKHAM. The Warsaw Pact outnumbers us in every account conventionally. If we look at tanks alone, you are talking over 42,000 Warsaw Pact tanks versus NATO's 15,000. The figures of fighting vehicles are comparable to that and artillery is comparable to that. It is these figures that lead General Rogers' testimony about an attack by the East that would lead us to resort to nuclear weapons relatively early.

That is why we need your support in terms of growth of conventional capability. Your point about taking away the nuclear deterrent is an interesting one, a relevant one.

It has been proposed that we reduce the intermediate range force, the SS–20's, ground-launched cruise missiles and Pershings we have there now. How those negotiations will come out is, of course, a subject for the future. We still have tactical nuclear weapons available to provide deterrence and those weapons that would be taken out could always be reintroduced later if the need arose. However, it does raise questions about the viability of defense when you begin to move in the direction of taking all weapons away.

ELIMINATION OF INTERMEDIATE RANGE WEAPONS

Senator JOHNSTON. Let me say my own view is that it would be in the security interest of both countries to do away with the intermediate range weapons if adequately supervised and we were certain that they were going to do that.

What I was really speaking of was the long-term goal of doing away with nuclear weapons altogether. If we were to do that, and I do not think we ever would because there would be some stumbling blocks in the way, I think it would be much more expensive if we tried to have some kind of parity with the Soviet Union in conventional forces.

Maybe you do need more in the attack than you do in the defense, but I would rather suspect that 50,000 versus 15,000, that kind of ratio, is sufficient to be on the attack. I think it would cost a lot more to buy 35,000 M-1 tanks than it would to buy a few Pershing II's or tactical nuclear weapons.

SITUATION IN NICARAGUA

General, would you be the one to speak of the situation in Nicaragua? I know SouthCom has been involved in that, or would that relate to the CIA or another group? Would you be prepared to speak about the situation in Nicaragua?

General WICKHAM. The internal situation?

Senator JOHNSTON. Yes.

General WICKHAM. I would refer that to the Central Intelligence Agency and to the Defense Department.

Senator JOHNSTON. Thank you very much, gentlemen.

Thank you, Mr. Chairman.

Senator STEVENS. Senator Cochran.

Senator COCHRAN. Thank you, Mr. Chairman.

MILITARY RETIREMENT SYSTEM

General Wickham and Secretary Marsh, I know you are both aware of the fact that there is a $2.9 billion reduction in the budget in anticipation of changes in the retirement system.

There is an indication in General Wickham's testimony that this could result, if changes are not made, in having to reduce the number of forces on active duty and make other dramatic changes in view of that authorization and appropriation change.

Do you foresee having to make any such changes in manpower as a result of that?

RETIREMENT ACCOUNT BUDGET EFFECTS

General WICKHAM. As you know, there was a cap on the personnel accounts pending the Congress developing an alternative retirement arrangement. Since that alternative retirement arrangement has not come out of the Congress, we remain deficient in the accounts.

I think the Congress ought to set a deadline of May to address the issue. All we are asking is that the deadline be extended pending the Congress developing a new approach toward handling retirement. If we do not, we are short money and we are going to have to let people out of the services to meet funding limits.

PERSONNEL LOSSES

Senator COCHRAN. To illustrate the size of the problem in terms of personnel, you point out that a loss of 120,000 Active and 112,000 Reserve component soldiers could result unless something is done?

General WICKHAM. Yes, sir. The Secretary of Defense made that comment also in his written statement.

Senator COCHRAN. With respect to the Reserve component, I know from your statement that there is increasing reliance on the Reserve and the Guard as well. I am particularly interested in recruiting and retention for the Reserve.

I wonder whether or not we are making that same kind of progress and having the same kind of success as you are with the Active Forces. Are the Reserve strengths being maintained through a successful recruiting and retention program?

RESERVE COMPONENT STRENGTH AND RECRUITING

Secretary MARSH. I will say to you both the Guard and the Reserves are reaching their ramps for both new accessions and retention, give or take a small percentage. It has been going extremely well.

I mention to you that we did a survey in the Army on soldiers who left the Active Army in the last 3 years. You are dealing with a group of roughly a third of a million people. In the sampling, and it was a statistically accurate sample, we have reason to believe around 40 percent of the soldiers who leave the Army have either joined the National Guard or the Reserve or plan to. So, we are getting this tremendous infusion of veterans into the Reserve and the Guard. This year there will be one soldier in the Guard and Reserve for every soldier on active duty, 781 to 781. They will move past the strength figure of the Active Force in another several years. They will move well past 800,000.

INDIVIDUAL READY RESERVE

Not included is a third of a million soldiers that we have in the Individual Ready Reserve [IRR]. We have an enormous increase in the IRR where we are using those people more and more as individual replacements into annual training and they are doing extremely well. We have National Guard and Reserve units in States that are better than 100 percent of their authorized strength.

In fact, in your State the National Guard strength is better than 100 percent of required.

Senator COCHRAN. I know in Mississippi we have a much easier time in recruiting and retaining Reserve personnel, in manning installations, and in taking care of the responsibilities that are given to the Reserve units. We are very, very proud of that record. Citizens there take a great deal of pride in being a part of the total Army even though they are in a Reserve status.

QUALITY OF LIFE ISSUES

One of the quality of life issues that has to be considered by a person in deciding whether or not to enlist or extend an enlistment or join a Reserve unit is the safety record, the chance of getting hurt or killed on the job. This is a consideration of young men and women as they decide on any kind of career or occupational activity.

What is the record of the Army in this area of quality of life? Are you doing a good job in the area of safety in training and in operations?

The military is inherently dangerous. We know the record will not be comparable to a lot of civilian jobs. The fact of the matter is that we do have a very real obligation to make training and operational activity as safe as possible under the circumstances.

What is your assessment of how well you are doing in that regard?

QUALITY OF LIFE—SAFETY RECORD

Secretary MARSH. I recently received a report from an Assistant Secretary who handles safety and we have made some enormous gains. I will say to you that there is less drinking in the Army than there has been in previous years and that is reflected in less traffic-related incidents.

There is a great emphasis on safety. Of course, one person killed is too many, but the number of people who are fatalities in training in areas that we think are inherently dangerous like parachute training, is almost zero.

General WICKHAM. I would like to add a couple of points to that, Senator Cochran.

One of my deep concerns is one you emphasized. In every command I had, I said, "I am the safety officer, not a warrant officer, not someone else, not an aviator, I am." I have subsequently directed all of my commanders to be safety officers. There is nothing that we do in the peacetime Army that warrants unnecessary risk to life and limb.

That still means we can have tough, demanding training. We have professionalized the Army's Safety Center at Fort Rucker, and now they look at ground accidents as well. We have found that simple things, such as when an accident occurs with a jeep, we find out we are adjusting the brake shoes wrong, and it is necessary to educate the mechanics.

By examining accidents, ground and air, I think we have helped ourselves avoid subsequent accidents. I think we are very professional about a hazardous occupation. We are doing everything we can to try to minimize the unnecessary loss of life and limb. Soldiers are the most precious resources that we have.

GI BILL

One of the most important Reserve recruiting tools that has come to us recently is the new GI bill. It provides for educational incentives for the Reserve component, $5,000 for tuition that a Reserve soldier can use. We did not have that before, and that is a very important tool in bringing in quality Reserve component soldiers. Go out and talk to the recruiters and talk to the people in the units, and they will say that is their No. 1 incentive.

Senator COCHRAN. Thank you.

I would like to commend you on the efforts you are making to modernize and make more effective and reliable the U.S. Army. I think you are doing an excellent job. I really mean it.

Secretary MARSH. Thank you, sir.

Senator COCHRAN. I yield back my time.

Senator STEVENS. Thank you very much.

Mr. Secretary, this Gramm-Rudman-Hollings impact is an interesting one.

Do you have a listing yet of the program changes you will make because of the March 1 sequestration?

PROGRAM CHANGE BECAUSE OF GRAMM-RUDMAN

Secretary MARSH. Yes, sir. I can furnish that for the record.

Senator STEVENS. Will that be a substantial program change in light of 9 percent real growth?

General WICKHAM. It was a reduction of about $1 billion in outlays for the Army in 1986. In outlays, $1.2 billion and roughly $2.9 billion in budget authority. It is spread around various accounts.

We tried to, based on the President's approval and congressional flexibility, exempt personnel accounts. We have to spread it into military construction, spread it into procurement, spread it into operation and maintenance accounts. We have had to cut back flying hours, and cut back the miles that vehicles will be allowed to drive. Of course, as the price of fuel comes down, then we may have some compensatory effect in the future. We will put the details in the record.

[The information follows:]

GRAMM-RUDMAN-HOLLINGS IMPACT

The table below provides a listing of adjustments made because of the 1 March 1986 Gramm-Rudman-Hollings sequestration.

G-R-H Appropriation Reductions
($ Millions)
Budget Authority

Appropriation	82	83	84	85	86	TOTAL
MILPERS					118	118
O&M					1,079	1,079
PROCUREMENT:						
AIRCRAFT			12	37	173	222
MISSILES			13	40	142	195
WTCV			39	64	230	333
AMMO			5	17	122	144
OTHER PROC			26	78	257	361
RDTE				24	235	259
MILCON	5	5	11	27	86	134
AFH		1	2	2	70	75
ASF					19	19
TOTAL	5	6	108	289	2,531	2,939

Although we prudently exercised the authority to exempt military personnel accounts and apply line item flexibility in other accounts, the impacts of the above reductions are still felt in all accounts.

In the military personnel area, we have implemented a 30 to 60 day Early Release Program for enlisted soldiers scheduled to end their term of service before 30 September 1986. There will also be 8,000 fewer operational and rotational moves in FY 1986. In the National Guard, 6,160 Guardsmen will not attend military occupational specialty schools or receive special training. In addition, 5,800 members of the Individual Ready Reserve (IRR) will not be called up for training.

Major impacts in the Operations and Maintenance areas include a 4% reduction in helicopter flying hours (75,000 hours), a 2% reduction in operating tempo and a $104 million decrease in depot maintenance. The backlog of maintenance and repair (BMAR) will not be decreased in real terms. A 5-10% reduction in headquarters administration and travel will also be experienced.

In Procurement, some weapon systems may have quantity impacts however, at this time, there are no known confirmed instances of any such occurrence as a result of the Gramm-Rudman-Hollings sequestration. The full nature and extent of programmatic impact cannot be determined for certain, until all FY 1986 contract negotiations are finalized.

RDTE major impacts will include two to four month delays and/or reduction in scope of work for two deep attack related programs, the Army Tactical Missile System, and the Joint Tactical Fusion Program, as well as the M1A1 Tank Block II Improvement Program, the 120mm Mortar Ammunition Development Program, and the HAWK Anti-Tactical Missile Development Program.

Major impacts in Construction include redesign of 25 projects, delay of bid openings on 75 projects, and a reduction of planning and design funds which will impact on the Army's ability to have projects 35% design complete for the next budget cycle.

CONTINUED ARMY PROGRESS

Senator STEVENS. We appreciate that. We have had a series of years now in which we have had projected budget increases that have not materialized by the time we finish the appropriation process. It seems that we are in another one of those years.

On the other hand, we have done our very best, particularly with the Army, to try to keep the Army on its course of not only modernization, but restructuring in order to protect your plan to improve the Army without increasing end strength of either the uniform or civilian personnel.

PRIORITY CONSIDERATIONS

I would like to sort of get some priority considerations as we go through these hearings. I am not asking for it now. I am sure you realize we ended up last year taking over $30 billion off the President's request, the original one that we received. We are going to have the duty of taking some funds off this request without any question in order to in effect hit the budget target without having to have the Gramm-Rudman impact.

That is going to take some close working relationship. We want to establish that at the outset this year. While I am not asking you to withdraw any request or to do something contrary to what you should be doing to support the President's budget, I hope you understand when we go through the hearings this year we are going to try to get some relative priorities.

For instance, Mr. Secretary and General Wickham, from your statements today I would say that the two issues that we have discussed here, the Bradley fighting vehicle and the follow-on of DIVAD are very high in your priorities; is that correct?

WEAPONS SYSTEM MODERNIZATION INITIATIVE

Secretary MARSH. That is correct.

Senator STEVENS. Higher than some of the other modernization items that we see in your budget. I do not want to pin you down, but would those be among your two most high priorities?

I am talking about procurement, new initiatives.

Secretary MARSH. The retention of the Bradley is high priority because it is a vital type of weapon system we need in modern warfare. We think it is capable of performing the mission it is assigned to do. It will remain a high priority.

The Forward Area Air Defense system is very essential for the defense of the Army forward forces.

INTERMEDIATE NUCLEAR FORCES [INF]

Senator STEVENS. Let me ask you about a sort of related problem. We have seen the President's response to Mr. Gorbachev. Some of us have been briefed about that in the past. I am very pleased to see it, myself.

STRATEGIC DEFENSE INITIATIVE

Should the INF agreement move forward quickly, and there is some indication that it might because of its being decoupled from the SDI argument, this seems to me to increase the necessity for assuring total readiness of the conventional forces that we have dedicated to NATO.

Have you approached this from the point of view of what will be necessary to augment the U. S.-NATO dedicated forces in the event we do reach an INF agreement patterned after the President's proposal?

Secretary MARSH. Senator, I have not and that would be by a specific tasking that would come down from Defense. I suspect it would go to the Joint Chiefs before it came down to me.

General WICKHAM. The bedrock part of that is getting the Allies to continue their own modernization programs with conventional capabilities, sustaining munitions as well as upgrading of their military forces.

BRADLEY HIGH PRIORITY ITEM

The Bradley and the air-to-air defense issue you singled out for high priority. They are high priority. The simple reason is that we have begun the modernization with the M1 tank which is headed for the major threat in Europe. That is where that tank is going, to Europe. We have to have an infantry vehicle that can keep up with the tank and fight along with it. The Bradley is that answer. If we did not have the Bradley, and went to the M113, we would not have the capability to capitalize on the strength of the tank.

You have to have some kind of Forward Area Air Defense system to protect them in the absence of the DIVAD. That is why air defense as well as Bradley are important to protecting the massive investment the Congress has already authorized with the M1A1 upgrading as well as with the artillery upgrading that we have in Europe, all are tied into deterring conventional conflict in NATO.

INF AGREEMENT

Senator STEVENS. I am one who believes that the INF agreement would be a great stabilizing move. I would hope that we would be able to asssess what our needs will be if it is achieved somewhere near the terms the President has outlined.

That does not mean we will no longer have a nuclear capability in Europe. It just means the delivery vehicles, the INF weapon systems would be removed. There still would be strategic nuclear and conventional bombers and Tridents out there. There is still a myriad of ways that nuclear weapons could still be delivered. But the fear of those intermediate vehicles would be removed from Europe.

I think it would be a very stabilizing force, myself, provided we have the will to assure our conventional capability is sufficient to meet the needs of our partnership in NATO.

I hope you are doing an assessment through the Joint Chiefs of that potentiality so that we are not going to suddenly have some crash demands that come about as though people thought this negotiation did not have any chance of success. I believe from what we have seen it has a much greater chance of success than most people realize right now.

NUCLEAR DEVELOPMENT IN BRITAIN AND FRANCE

Senator PROXMIRE. The chance of success also depends on France and the United Kingdom. It has been reported they are in the process of building up their nuclear capability rather than stabilizing it.

France particularly, it seems to me, will be a tough customer. I think they have to be brought into the negotiations before anything can be finalized.

SPENDING FOR NEW AIRCRAFT

It is my understanding that the Army plans to increase its spending for new aircraft by 5 percent annually. That is a high increase considering DOD is only talking 3 percent real growth and Congress will allow zero growth if you are lucky.

The Army is spending $4 billion annually on aircraft and plans to spend $6 billion annually in the future. Just LHX alone would wind up costing $40 billion according to some independent study. My question is a long-range one, but one I think should be asked in this era of Gramm-Rudman-Hollings.

DOD is supposed to have just one Air Force. In reality, we are ending up with three. We have U.S. Air Force, the Navy has its own Air Force, Army has its own Air Force. Don't we have a tremendous amount of duplication with three Air Forces?

ARMY CLOSE AIR SUPPORT REQUIREMENTS

Secretary MARSH. I would have to speak for the Army. I think that for the close air support that can be furnished along with the mobility and the transport of the combat soldier, you are going to have to rely on rotary wing aircraft. That is a mission to assure that it is there and can best be performed by the Army.

Now, in reference to duplication, General Wickham and General Gabriel, who are both cognizant of the need for mutual support, and have entered a series of agreements to try to reduce duplication of systems. General Wickham might want to speak to that.

General WICKHAM. That is right. General Gabriel and I in our unprecedented agreement here emphasized the Army's responsibility for rotary wing activity.

Also, the Army is moving out of the realm of gathering moving target intelligence with airframes and relying on the Air Force to do that with TR-1 type aircraft rather than duplicate that capability.

Those are some of the major areas where we have tried to minimize duplication with the Air Force. Yes, there are a lot of vehicles out there, but we are dealing with a threat that involves substantially rotary wing and fixed wing aircraft.

CLOSE AIR SUPPORT

Senator PROXMIRE. The Air Force is supposed to provide close air support for the Army, but the Army is buying attack helicopters by the hundreds for close air support. One of the missions of LHX will be to provide close air support.

Cannot we reduce aircraft buys and reduce some of the duplication of efforts?

General WICKHAM. The capability of helicopter attack on armored vehicles, which the Soviets have with the HIND, the HAVOC and HOKUM aircraft, and which the Army has with the Apache and the Cobra, is a capability that the Air Force could provide. The Air Force could take over those slow moving aircraft that can take over and pick up targets.

However, we split responsibilities and we said the Army will do that mission and the Air Force will provide fixed wing fast craft; provide for heavy bomb loads, and provide fixed wing aircraft that can fulfill the function of battlefield area interdiction. The Air Force is, by and large, moving in the direction of multi-purpose fixed wing aircraft. Would that we could move in the direction of fewer aircraft, and I think that we have tried to minimize the duplications here. There is a synergism that comes from the interaction of rotary wing and fixed wing aircraft at the line of contact.

Senator PROXMIRE. I appreciate your sentiment. Looking at this overall from all my experience, I was in the Army in World War II, my father was in it in World War I. Both my grandfathers were in the war between the States. So, it is all in the Army, solid Army sentiment.

I think the Army has been pushed around a bit. I prefer to see the Army rather than the Air Force and Navy have more attention and more resources. In this case it just seems to me there is a duplication that we ought to do our very best to see if we can reconcile ourselves.

DEBT COLLECTING BY ARMY

Let me ask you this. This is the result of the golden fleece I gave to the Defense Department recently. Last July I asked the General Accounting Office to investigate the Army's procedures for collecting debts owed to it by former Servicemen. Last month the GAO issued its report indicating that former Servicemen had skipped away with over $100 million in Army money in the last 6 years.

The report found all kinds of problems in bureaucratic follow-ups in the Army's debt collection operation. Some of the Service members had difficulty paying off the debt because the Army would not take it. I realize the other Services have low collection rates.

My question is: What exactly is the Army doing as a result of this latest GAO report?

SOLDIER INDEBTEDNESS COLLECTION INITIATIVES

Secretary MARSH. I noticed your comments on that and I took some exception to them as I suspected you thought I might.

In 1982 you wrote and told us what a good job we were doing in collecting back accounts. We sought over a period of time to be able to contract out this function which we were not permitted to do on debt collection.

Senator PROXMIRE. Where can't you do that?

Secretary MARSH. We can now. We were granted that authority this fall to do it. I believe it is now done through GSA. I will say to you, however, that in getting into some of the comments that you made, you did pinpoint areas that we had not done as well as we should. There are problems in the Federal system, particularly on the collection of smaller claims. Certain levels the Department of Justice does not want to fool with and there is a lot of bureaucracy to deal with.

Another area I would like to point out to you to correct any misimpression I know you did not mean in your statement. We are not permitted by law to keep a service person in the service at the time they end their tour of service for collection of a debt. Where we see we are coming up to the discharge date of a service person and they owe us money, we begin to start making efforts before they get out of the Army to collect those sums.

The writeoff of some of those accounts I think you will find did meet the requirements that are established for the write-off of Federal claims. There is a substantial number of debts we are still seeking to collect. I think we are continuing to develop procedures that will be helpful in doing that.

Senator PROXMIRE. One of the more outrageous parts is in some cases former members of the armed forces agreed to pay off and the payoff schedule they submitted was rejected. Let me give you an example. A former female Service member owed the Army $545, remarried to an enlisted man currently in the Army. "I am a housewife with no income now. So, take $50 a month out of my husband's paycheck to pay off the debt."

"We will not do that," says the Army bureaucrat. So, they made no more payments. The Army wrote off the debt. The GAO uncovered others, too.

Secretary MARSH. I will certainly pursue the one that you raised. One that was similar to that was discussed where it was a question of whether or not we could go into the account of a spouse and do that.

Could I ask the Director of the Army budget to speak on this?

General McCALL. We have completed a review to remove all those bureaucratic impediments when a person comes forward to offer payment. We have since received the authority to contract that the Secretary spoke to and we are negotiating to get a contractor to take over those debts.

We have every procedure open in the Army where we can have access to recouping potential pay. For example, recently at an IRR muster we checked our own rolls against the muster and found that 13 of the call-ups owed us something. We are trying our best to respond to your concerns.

SOVIET ARMY INDISCIPLINE FACTORS

Senator PROXMIRE. I am very impressed, as Senator Johnston said he was, at the remarkable record you have on improving drug abuse and AWOL.

Do you have any notion of the Soviet Union's problems in this respect in Afghanistan?

We have heard that they are in really bad shape. Their alcohol abuse problems, AWOL are not getting better. It is getting worse. It would be interesting to have a comparison.

Secretary MARSH. I have heard some discussion of that. The issue you raised about alcoholism is a very real problem, not just the Soviet Army, but in the Soviet society. I can arrange to get you information on the Afghanistan performance of the Soviet soldier and brief you on a classified basis, if you would like.

Senator PROXMIRE. It seems to me that contrast as well as the substantial improvement you have had in the last 4 or 5 years is especially important and reassuring.

DRUG USE

Secretary MARSH. It is useful to note that the disuse or nonuse of drugs in the Army is significantly below the same age group in civilian life. In fact, on the random analysis taken most recently in the Army it only disclosed 5.2 per thousand using drugs. This is a remarkable statistic and I will endeavor to get you the information.

[The information follows:]

AFGHANISTAN: SOVIET INDISCIPLINE INDICATORS

Information contained in this insert is classified and has been provided to the committee separately.

FRINGE BENEFITS

Senator STEVENS. I am constrained to say that this does not even take into account the fringe benefits such as health care, housing allowance, noncontributory retirement. Pay alone of the armed services has increased 45 percent in the last six years. I think that has had a great deal to do, Mr. Secretary and General, with the impact you have described to us today. We hope we can continue that concept.

CIVILIAN PERSONNEL CONCERNS

As I said to the Air Force the other day, I am worried about your civilian portion in the Department of Defense because in the period of time that the military uniform people have had, since 1970, a 214.2 percent military pay increase. In the same period of time the civilian sectors have had a 105 percent pay increase.

We are getting near the point of diminishing returns in preserving that inequity. I think you are going to have to find some way to be sure that the pay for the civilians that you need for the Department of

Defense is kept in balance. I think there was an imbalance to begin with.

Now I think it has been pretty well straightened out. It is liable to tilt the other way. The civilians in the Department of Defense may well find they are not properly compensated and we are liable to lose the quality of people we need there.

I would hope you would direct your attention to that in the years ahead.

AIR DEFENSE PROCUREMENT

Senator RUDMAN. I want to say, General Wickham, that there is strong support for your discussion of priority of procurement for air defense in the Department of the Army.

You are in a position of the lady who put on a silk dress, corsage and hat and walked out in the rainstorm without an umbrella. The Congress did not think that DIVAD would work as it was supposed to against the threat you described and thought it just cost too much.

Had DIVAD worked the program would probably still be on line despite the cost. I think you can come up with a solution—a combination of missile weapons or individual units. We cannot invest the kind of money we are investing in M1 tanks, Bradley vehicles, let alone the people, and have no defense for armored columns.

I hope the Army will come forth early with its proposals.

INF

I want to ask a brief question on INF. Mr. Chairman, I know we have a problem asking questions for the record because of the possible cost involved, so I am going to pose one.

Senator STEVENS. I just asked that they notify me if anyone asks a question that takes more than 2 hours. We will refer it to the committee to see if it is out of hand.

Senator RUDMAN. Assuming that the INF Treaty is signed sometime next year, could you furnish this committee with the number of slots the treaty would eliminate in Europe for the Pershings, GLCM's and the support and logistics behind that?

I visited most of those units. I have some feeling about what the direct numbers are. I feel there are indirect numbers there also.

General WICKHAM. We can do that.

[The information follows:]

INF TREATY

Any potential reductions are contingent upon numerous factors that should be considered. [Deleted.] Force reductions associated with an interim agreement would be dependent upon the PII–GLCM mix allowable under an agreement and the deployed level of these forces. [Deleted.] Additionally, PII related manpower slots associated with a reduction in deployed PII levels will not necessarily result in reductions in overall USAREUR troop levels. Potential reductions in manpower slots associated with a bilateral agreement with the Soviets will require a detailed force analysis which considers USAREUR and SHAPE force requirements, the level of LRINF missile deployments and emerging weapons requirements based upon the force balance resulting from the agreement. The ultimate reduction of troop slots will remain dependent upon a broad spectrum of forces to include not only those nuclear forces effected in the bilateral INF negotiations but those conventional forces included in the multilateral MBFR talks as well.

PROCUREMENT OF COPPERHEAD

Senator RUDMAN. We have an interesting history on Copperhead. I understand you are now looking to complete it, although there are still problems with the circuit board.

What is the status of the Copperhead at this time?

General WICKHAM. There are no known problems with Copperhead at this time. Are you talking about second sourcing?

Senator RUDMAN. I'm talking about the competition and reliability of the present stockpile which we have paid a lot of money for.

General WICKHAM. The reliability factor is back up there. We did have some earlier problems with a few of them. Although reliability is up there we are looking for second sourcing.

Senator RUDMAN. Do you believe that will bring the price down?

General WICKHAM. That is the hope.

Senator RUDMAN. It was about $40,000 a round which seems like a lot of money, but I suppose it is not if it takes out a tank one on one.

What is the present cost?

General WICKHAM. Let me put that in the record, but I think we are down between $30,000 and $40,000 per round. Of course, it depends on the buy and our buy is relatively small in the neighborhood of 30,000 to 40,000 rounds.

[The information follows:]

COPPERHEAD PRICE

The average contractor unit price negotiated on a firm-fixed price contract was $35,200. This was for a total quantity of 3,653 rounds in fiscal year 1985 of which 3,253 were Army rounds. The last 1,400 rounds came in at the congressional directed price of less than $30,000 each.

General WICKHAM. There is a total requirement including the Marines, of around 190,000 rounds and that is the break-even point where you really bring the price down.

Senator RUDMAN. I hope you keep us informed on your efforts to complete that.

General WICKHAM. We do have to submit a plan to second source the Copperhead and we intend to do so.

SPECIAL FORCES HELICOPTER SUPPORT

Senator STEVENS. You have a request for $24.7 million for research and development, 3.5 for procurement, initial funding for special operation forces helicopters, MX–60X and MX–47E. We do not know really what is going on. We think you ought to give us a response for the record if you will.

We understood there was an agreement coming between Army and Air Force on helicopter support for special services. Yet we understand the special forces MX–60X which is proposed now in this budget is slightly less capable than the HH–60 which the Air Force canceled because it was too expensive.

We want to know what will be the difference between the Air Force's HH-60 and the Army's MX-60X and really are we going to get disagreement between the Army and Air Force or are we going to be setting up competing services once again?

SPECIAL OPERATIONS ROTARY WING AIRCRAFT REQUIREMENTS

General **WICKHAM**. No, sir. There is a need to improve the special operations rotary wing short-range capabilities of the Army. The issue of whether the Army takes over the whole rotary wing insertion capability is still open.

The Air Force has the HH-53 PAVELOW's that are long-range search and rescue-type aircraft that can be aerially refueled. The Air Force is intending to improve that capability. The issue between the MX-60 and the HH-60 is still up in the air. The Under Secretary of the Army is involved in examining the issue to make sense of it. The HH-60 is not as mission capable as the MX-60. It has an older engine that does not have the lift capability, but the avionics are similar but not the same. The MH-47E is upgrading CH-47D with a refueling probe and all-weather avionics suite. These are a relatively small number of aircraft to give short-range, rotary wing insertion capability for our special operations forces.

The Air Force has less than a dozen PAVELOW's for rotary wing insertion capability right now. Jointly, this would probably increase the rotary wing insertion capability for our special operation forces from about ten or twelve up to 50 or 60 helicopters.

INITIATIVE 17

Secretary **MARSH**. I would add that the transfer of Air Force assets for this type of insertion was one joint initiative they wanted to do, but exception was taken in the House of Representatives. That is called Initiative 17 and was not able to be implemented for legislative reasons, transferring that mission to the Army.

Senator **STEVENS**. We look forward to your giving us a follow-up.

[The information follows:]

INITIATIVE 17

The Army is preparing to assume responsibility for all rotary-wing airlift support for Special Operations Forces [SOF] now being performed by Air Force rotary-wing units. We already have a force of 107 helicopters exclusively dedicated to this purpose, many of which have enhanced night and longer range operations capabilities. In fact, in the first quarter of FY 87 we are fielding an additional aviation company with the mission of providing aviation support to our special operations forces. The SOF aircraft modification program is a development and procurement program to provide the Army with helicopters capable of night, adverse weather, low-level, extended range penetration capabilities through unfamiliar mountainous terrain. Aircraft will be provisioned with extended range fuel systems, including aerial refueling capability, an integrated cockpit/mission management system, forward looking infrared [FLIR], terrain following/terrain avoidance radar, enhanced engines, enhanced transmission (MH-60X only), world-wide secure communications, and other SOF equipment. The Army FY 87 request reflects OSD guidance and initiatives funding for additional rotary-wing aircraft to meet the requirements of the Unified Commands and the Joint Special Operations

Command. It is my view that readiness of our special operations forces will increase as a result of this initiative.

CONCLUDING REMARKS

Senator STEVENS. I went out to see my friend, Mr. Kimmett, who is in the back of the room. He put me in an Apache. That is a mean machine, I tell you. If anyone has not seen the difference between that and the old helicopters, they ought to take a ride with those people out there. It is really a fantastic piece of equipment.

Senator Sasser.

Senator SASSER. Thank you, Mr. Chairman.

I trust Mr. Kimmett was not flying the Apache?

Senator STEVENS. He would not let me fly it either.

Senator SASSER. I apologize for being detained this morning. I did have an interest in hearing the testimony of Secretary March and General Wickham. I shall read their testimony with great interest.

Rather than detain the committee this morning and our witnesses, I would like to submit some questions for the record which can be answered, I am confident, within the Chairman's 2-hour rule. In fact, they might be answered within 15 or 20 minutes.

It is a pleasure to see you, Mr. Secretary and General Wickham. I look forward to getting some responses to my questions for the record.

Secretary MARSH. Thank you.

SUBMITTED QUESTIONS

Senator STEVENS. Thank you very much. I appreciate your submitting those questions. All submitted questions will be inserted in the record at this point.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR ANDREWS

EDUCATIONAL ASSISTANCE PROGRAMS

Question. Mr. Secretary and General Wickham, like my colleagues on the Defense Subcommittee, I am thoroughly impressed with the success the Army has had in attracting and retaining high quality individuals in recent years. I also believe that, if the Total Army is going to attract better than 200,000 non-prior service accessions annually for the next two years, the Congress is going to have to do its part to make that possible. I am informed that the Defense Department, at the direction of the Office of Management and Budget, intends to offer legislation to repeal the new GI Bill which became effective July 1, 1985. I'm not going to ask you to argue the merits of the new GI Bill, but I would like you or General Wickham to comment relative to the importance of an educational assistance program in recruiting and maintaining a quality force.

Mr. Marsh. The Army has used educational assistance incentives since FY 79 as a major attractor of quality accessions into the Army. There have been a wealth of studies both in and out of DOD and from 1970 through a 1985 Rand study. These studies support the concept that educational assistance is a prime motivator for youth, especially quality youth to enlist in the military. The Army must have and use educational incentive enhancements (Army College Fund or "Kickers") to make the Army competitive in the recruiting market place, especially with the dwindling pool of potential recruits. At a time when we are placing more and more reliance on the reserve components, elimination of such a vital recruiting and retention tool, together with the uncertainty of what program to offer, may dramatically impact on our capability to continue recruiting quality youth into the reserve components. In summary, educational assistance incentives provide for market expansion, assist to attract and distribute quality accessions and help make the Total Army competitive in the market place with the other military services.

ACTIVE GUARD AND RESERVE FULL-TIME SUPPORT PERSONNEL

QUESTION. Included in the FY 1987 President's budget are two general provisions dealing with management of the full-time support force of the Army National Guard and Army Reserve. Proposed section 8035 continues the prohibition against converting a military technician position to a position to be held by a person in an active Guard or Reserve status if that conversion would reduce the total military technician population below 66,086. The FY 1987 President's budget provides for a growth of 6,490 active Guard and Reserve positions. Given the cost differential of the two forms of manpower doing the same jobs, it seems prudent in light of today's budget constraints to straight line the active duty strength at current levels and provide the proposed growth in military technicians. Mr. Secretary, would you comment please?

ANSWER. Growth in both Active Guard Reserve (AGR) and Military Technicians (MT) strength is needed if the ARNG and USAR are to maintain the unprecedented level of readiness now demanded of them. The assumption that AGRs and Military Technicians do the same job is erroneous. They do not do the same job and are not interchangeable. It was in recognition of this fact that led GAO to recommend, in the 1985 report in the Army's FTM Program, that we realign our Full-Time Support (FTS) Force by transferring all technician positions from deploying units. This recommendation was formulated based on data collected by a year long audit which indicated that Military Technicians were ideally suited for service within major headquarters, maintenance and other support activities where deployability is not a key factor. Whereas the Guard and Reserve units require a unit cadre of full-time equipment operators, training and administrative duties could be best satisfied by full-time military personnel. The specific advantages of this plan cited by GAO were:

-- It offers a solution to the problem of technicians unable to deploy with their units, whereas the all-technician choice would only prolong the situation.

-- Military pay and benefits, which are higher than comparable civilian pay scales, are a positive factor in the recruitment and retention of qualified personnel.

-- It eliminates management problems associated with a mixed force in troop units.

GAO also endorsed the Army's 1985 cost-benefit analysis. Analysis revealed that the slight cost advantage enjoyed by technicians was more than offset by the readiness advantages yielded by AGR soldiers who are available to perform mission tasks unhindered by the work rule restraints (e.g., overtime pay, compensatory time off for work in excess of 40 hours). The ability of the AGR soldiers to respond to real world needs and crisis was demonstrated when the Reserves were called on to meet civil affair requirements for Grenada. They are also readily available to attend service schools, participate in training with AC units and undergo other forms of instructions necessary to acquire and maintain skill proficiency comparable with their active component counterparts. These factors led the GAO auditors to conclude that the AGR force gives the reserve component a better trained and experienced full-time force than they have had in the past. Moreover, the AGR force has made it possible for us to accommodate the transfer of greater mission responsibility to the National Guard and the Army Reserve. This transfer in turn, has yielded a significant cost savings by enabling the country to satisfy its defense obligations without an increase in the active Army. By authorizing increases in AGR and Military Technician strengths and realigning Military Technician positions to nondeploying organizations, the FTS program provides the Army a very cost effective means of manning the full-time force to meet Reserve readiness requirements. The curtailment of the proposed AGR growth in FY 87 would greatly hamper the Reserve Component's ability to maintain and increase their vital mission as part of the total force structure. Therefore, it is essential that the proposed AGR growth be continued to afford the reserve components the opportunity to receive and carry out its increased defense obligations.

QUESTIONS SUBMITTED BY SENATOR D'AMATO

Award of Contract to Foreign Company

Question:

Recently, the Army awarded a $9.4 million contract for fuel pumps to a foreign company (Termomechanica Italiana of Italy) after the contract originally had been awarded to Goulds Pumps, Inc. Because of an Army error, Goulds had to rebid the contract. I understand that this Italian company is in part or wholly owned by the Italian government. This would allow that company's bid to be subsidized. Does the Army generally consider such factors such as this when awarding a contract to a foreign company? Did it in this particular case? (Why not?)

Answer:

The Government of Italy is both a signatory to the Agreement on Government Procurement and a Memorandum of Understanding with the United States on mutual cooperation in research, development, production and procurement of defense equipment. As a result of these agreements and the Federal Acquisition Regulation, offers of Italian firms are considered on an equal basis with domestic offers. It is Department of Defense policy to permit participating NATO countries to compete with domestic contractors on a fair and equal basis. The U.S. Government is not precluded from contracting with a company owned in whole or in part by a foreign government and the Army does not adversely evaluate such a factor. The above situation exists not only for Italy, but also our other NATO allies.

QUESTIONS SUBMITTED BY SENATOR STENNIS

QUESTION. Mr. Secretary, last year's report on the Military Construction Appropriation Bill included language directing the Department of the Army to initiate planning and design in cooperation with the Military Traffic Management Command for Texas Flat Road in Hancock County, Mississippi. This road serves both the Mississippi Army Ammunition Plant and the National Space Technological Laboratories. The language also stated that this project should be included in the Fiscal Year 1987 Military Construction budget request. In looking at this year's Military Construction program I notice that funding for Texas Flat Road is not included. Would you please tell me the status of this project? Has the planning and design of this defense access road begun? Can we expect this project to be included in next year's Military Construction program?

ANSWER. The Defense Access Road Program has been established to provide a means for defense agencies to pay their fair share of the cost of highway improvements made necessary as a result of sudden and unusual defense related impacts. A sudden and unusual defense impact is defined as a doubling of traffic volume in a relatively short time frame (for example, one year or less). In these instances, the Defense Department could not expect state or local highway authorities to include such improvements for the doubling of traffic in their short or long range highway development or maintenance programs. Doubling is usually associated with a large increase in defense mission at an installation or opening a new gate. The Army finds no unusual impacts on Texas Flat road resulting from defense generated traffic or requirements.

Access to the Mississippi Army Ammunition Plant and the National Space Technological Laboratories is provided by State Highway 607. Neither the Army nor the Space Laboratory have a requirement for opening access points to the Ammunition Plant along Texas Flat Road. Texas Flat Road serves only as a commuter route by a limited number of employees. No unusual mission related requirements have been identified for either normal operations or mobilization which would cause impacts on Texas Flat Road.

Based on the above we have not pursued planning and design for improving Texas Flat Road. If Texas Flat Road requires upgrading, it is due to normal public growth and development and, therefore, it is not eligible for the Defense Access Road Program. Upgrading should be done with federal aid, state or local highway funding.

RESERVE COMPONENT TRAINING

QUESTION: In your posture statement (ref. pages 13-14), you indicate that many Reserve Component units do not have the minimum essential equipment to conduct training. You indicate that, in 1983, you initiated a program to deal with this problem--the Minimum Essential Equipment for Training (MEET) program. This program identified 500 problem units and 500 types of equipment that are required. So far, you report that training of over 300 units has been improved by distribution of equipment. Please tell us if the 300 units where an improvement has been made now have sufficient equipment to conduct meaningful training. What are your plans for the remaining 200 units where no improvement has been made? When can we expect that all Reserve Component units will have at least sufficient equipment to conduct realistic training?

ANSWER: The 300 units which have received equipment thru the Minimum Essential Equipment for Training (MEET) distribution program now have sufficient equipment to conduct meaningful training. The equipment shipped to the units was what they had identified as essential and requisitioned. Requirements for the remaining 200 units have been validated and those units have been advised to forward requisitions. As the requisitions are received, the identified equipment will be redistributed pending availability. The Army's goal is to have all the equipment identified as essential by the 500 units redistributed by October 1986, pending availability.

EQUIPMENT FOR ARNG AND USAR UNITS

QUESTION. The FY 1987 DOD National Guard and Reserve Equipment Report provides data on the dollar value of equipment scheduled for distribution to the Reserve Components at the beginning of FY 1985 and the actual distribution of the programmed equipment that took place.

Percent of 1985 Program Achieved
(Ref. Pages B1-2)

Air Force Reserve	94.0
Air National Guard	91.9
Marine Corps Reserve	89.3
Naval Reserve	82.7
Army National Guard	65.1
Army Reserve	25.3
Average DOD-wide	77.4

Above-average rates of distribution were achieved by the Air Force Reserve (94%), Air National Guard (92%), Marine Corps Reserve (89%), and Naval Reserve (83%). The poorest performances were achieved by the two Army Reserve Components--the Army National Guard (65%) and the Army Reserve (25%). Can you tell me why the Army has done so poorly in distributing equipment to its Reserve Components?

ANSWER. The Army has done an outstanding job in providing equipment to the Reserve Components. Actual FY 85 distribution to the Reserve Components was over 1.5 billion dollars. This distribution exceeded our projection of 1.4 billion dollars and represents a 58% increase over FY 84 distribution of .946 billion dollars. FY 84 distribution more than doubled from the FY 83 distribution of .465 billion dollars. The table above reflects only selected items of equipment (3.4% of total items) and cannot be use in isolation. Periodic changes in requirements accounted for many unprogrammed deliveries. It must be noted that although the programmed Force Readiness Report deliveries to the Guard and Reserve reflected in the table above, were met with limited success, unprogrammed deliveries raised the overall performance data to 91.1% for the Army National Guard and 42.1% for the Army Reserve. The Army continues the policy of equipping units on a "First to Fight" basis. Based upon the upward trend line of equipment distribution to the Reserve Components, it is evident our policy remains very effective.

REDUCTION IN SPARE PARTS PROCUREMENT

QUESTION. In the 1987 budget, the Army's request for major items of equipment is the same as what the Army had planned for FY 1987 a year ago. For example, the number of aircraft, tanks and fighting vehicles in the 1987 budget is exactly as planned a year ago.

	FY 1987 Jan 1985	FY 1987 Jan 1986		
	Planned Buys			
Total Aircraft	240	240		
M1 Tanks	840	840		
M2/3 Bradley Fighting Vehicle	870	870		
	Spares and Repair Parts ($ Millions)			
			Change	
			$	%
Aircraft	1,198	711	-487	-40.7
Missiles	320	151	-169	-52.8
Tracked Combat Vehicles	696	470	-226	-32.5
	2,214	1,332	-882	-39.8

However, the Army has sharply reduced planned funding for readiness and sustainability. Funding for spare parts for aircraft, missiles and tracked combat vehicles is nearly 40% lower than planned a year ago. Why has the Army chosen to sharply reduce planned readiness funding, while completely protecting funding for new major items of equipment?

ANSWER. While it may appear that the Army has sharply reduced planned readiness funding in the FY 1987 President's Budget, such is not the case. The prime driver of the reductions was an Army decision that the previously planned sustainability level for war reserve spares was not affordable in FY 1987 (-$376 million). The peacetime spares requirements decreased during the normal recalculation process due to changes in the major item deployment schedules, upon which initial spares requirements are based, in FY 1988 and FY 1989 and changes in customer demand patterns (-$253 million). In addition to the above reductions, Office of the Secretary of Defense directed budget reductions to the spares funding for a number of reasons, the most significant being the Army's inability to fully obligate the previous year program, (-$184 million). The application of revised inflation factors also reduced the spares dollar requirement (-$69 million). As a result of these reductions, the FY 1987 program for the above three spares programs was reduced by $882 million. Our current request fully funds our readiness related spares requirements.

SPECIAL OPERATIONS FORCES

QUESTION: A suggestion has been made in the Congress that all Special Operations Forces, including those in the Army, be consolidated into a new sixth military service. Does the Army support this proposal? If not, why not?

ANSWER: No, the Army does not support the creation of a new sixth military service for Special Operations Forces (SOF).

Most examples of SOF failures are old business and required the use of then-standard equipment and technologies in situations that demanded the state of the art in all aspects from command and control (C^2) to individual equipment. More recent operations have been stymied by lack of other-nation cooperation over which the Services have no control. Other operations in the foreign internal defense arena have received almost no notice but have been very successful indeed. All of our experience has provided lessons and, in some cases, new organizations within the present system, that are serving us well.

Army SOF is an integral part of the Total Army. While not as dependent upon conventional Army forces for support as Air Force SOF (for maintenance, refueling), both conventional and unconventional Army forces are inextricably bound in mission, philosophy and operational concepts and are wholly reliant upon each other for personnel, training, and operational support throughout the conflict spectrum, from peace to war. To separate them would be counterproductive as Army needs for unilateral special operations and the forces to conduct them will persist.

We see the current public discussion of SOF as a healthy and natural part of the process necessary to stimulate growth of SOF toward the goal of preserving the NCA's ability to direct those operations it wishes, toward preserving the CINC's role as war fighter, and toward a system that ensures resourcing in consonance with national policy and requirements. That a discussion is ongoing does not constitute evidence that a radical change is warranted. The Army believes that the growth process is viable and that progress toward the goals outlined above is self-evident.

QUESTIONS SUBMITTED BY SENATOR BYRD

QUESTION. Would you please provide for the record the latest information on accelerating West Virginia military construction projects ($16.8 million).

ANSWER.

Accelerating MCA CP Dawson project ($8.7M) from FY 88 to FY 87 Program.

Accelerating two of four MCAR projects in WV: New Martinsville ($1.3M) from FY 89 to FY 88; and Parkersburg ($3.3M) from FY 90 to FY 89.

Accelerating six of nine MCARNG projects in WV: Pt Pleasant ($0.9M), Kingwood ($0.7M) and Cp Dawson Phase II ($1.1M) from FY 89 to FY 88; Cp Dawson Phase III ($1.1M) from FY 90 to FY 88; Cp Dawson Phase IV ($1.1M) from FY 91 to FY 89; and Cp Dawson Phase V ($0.7M) from FY 92 to FY 90.

ARMY NATIONAL GUARD AMBULANCE DETACHMENTS IN WEST VIRGINIA

QUESTION. Would you please provide for the record the latest information on stationing two National Guard ambulance detachments (12 helicopters and 106 personnel) in West Virginia.

ANSWER. Two ambulance detachments are programmed for the West Virginia Army National Guard in FY89. Stationing of the units has not been determined.

ARMY RESERVE STATIONING - WEST VIRGINIA

QUESTION. Would you provide for the record the latest information on stationing elements of the Third Brigade, 80th Training Division in West Virginia (Brigade Headquarters, Second and Third Battalions), Light Equipment Company and Ground Ambulance Company -- over 6 00 Reserve personnel).

ANSWER. This question has been answered in Insert #3, page 16, line 14.

91st RESERVE MILITARY INTERROGATION COMPANY

QUESTION. Would you plase provide for the record the latest information on stationing the 91st Military Interrogation Company (90 personnel) in West Virginia.

ANSWER. This question has been answered in Insert #3, page 16, line 14.

STATIONING AN ACTIVE DUTY MILITARY INTELLIGENCE UNIT

QUESTION: Further research is being conducted by the Department of the Army on my initiative to locate an active duty military intelligence company in West Virginia. What is the latest on this proposal?

ANSWER: The US Army Intelligence and Security Command (INSCOM) has been tasked by Headquarters, Department of the Army to study the feasibility of stationing an active Army military intelligence battalion(-) in West Virginia. The INSCOM study will include identifying requirements and costs for facilities, communications, security, logistics support and other augmentation required for establishing a stand-alone unit, as well as considering any operational readiness impact. The INSCOM study is expected to be provided to HQDA in May 1986.

QUESTION. Mr. Secretary, please update for the record the information provided last year regarding which construction projects are contemplated in the latest Army, Army Reserve, and Army National Guard five-year plans for West Virginia. Please indicate the project description, the location, the estimated cost and the fiscal year in which the project is contemplated, as well as include a Standard Form 1391 in the record for each proposed project. Which, if any, of these projects could be accelerated into fiscal year 1987? For the projects which are underway or budgeted in FY 1987, please provide an updated schedule, including significant milestone events, leading to full realization of these projects.

ANSWER. Student Training Facility, Camp Dawson, $8.7 million, FY 87, 1391 attached; Reserve Center Addition, New Martinsville, $1.3 million, FY 88, 1391 attached; Reserve Center Reserve Center/Organizational Maintenance Shop/Area Maintenance Support Activity, Parkersburg, $3.3. million, FY 89, 1391 attached; Reserve Center, Rainelle, $2.4 million, FY 91, 1391 attached; Reserve Center, Kingwood, $1.4 million, FY 91, 1391 attached; Reserve Center, Elkins, $1.0 million, FY 91, 1391 attached; Training Facility (Phase I), Camp Dawson, $.8 million, FY 88, 1391 attached; Organizational Maintenance Shop Addition and Alteration, Buckhannon, $.4 million, FY 88, 1391 attached; Armory Addition and Alteration, Point Pleasant, $.9 million, FY 88; Armory Addition, Kingwood, $.7 million, FY 88; Training Facility (Phase II), Camp Dawson, $1.1 million, FY 88; Training Facility (Phase III), Camp Dawson, $1.1 million, FY 88: Training Facility (Phase IV), Camp Dawson, $1.1 million, FY 89; Training Facility (Phase V), Camp Dawson, $.7 million, FY 90; Aviation Support Facility, Parkersburg, $3.0 million, FY 89.

No projects are recommended to be accelerated to the FY 87 program.

The Armed Forces Reserve Center at South Charleston is currently under construction. The estimated completion date is June 1986. The contract cost for this project, as of February 1986, is $3,353,301. A contract was awarded in January 1986 for the Reserve Center Expansion at Ripley. The contract amount was $1,474,599. A notice to proceed was issued in March 1986. The estimated completion date is March 1987. Final design of the Student Training Facility at Camp Dawson was started in December 1985. Design is expected to be completed and ready for advertisement in July 1986.

1.COMPONENT ARMY	FY 1987 MILITARY CONSTRUCTION PROJECT DATA	2.DATE 14 FEB 86

3.INSTALLATION AND LOCATION Camp Dawson, West Virginia	4.PROJECT TITLE Student Training Facility

5.PROGRAM ELEMENT 22696A	6.CATEGORY CODE 721	7.PROJECT NUMBER 1	8.PROJECT COST ($000) Auth 8,700 Approp 8,700

9.COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Primary Facility				6,267
200 PN Brks Open Bay w/Classrms	SF	43,500	55.85	(2,429)
50 PN Barracks	SF	23,100	77.48	(1,790)
Dining Facilities (200 PN)	SF	11,800	91.48	(1,079)
Headquarters and Supply Building	SF	9,000	42.18	(380)
Maintenance Building w/4 Bays	SF	6,850	43.31	(297)
See Cost Estimates (Continued)				(292)
Supporting Facilities				1,570
Electric Service	LS	-	-	(170)
Water, Sewer & Gas	LS	-	-	(395)
Paving, Walks, Curbs & Gutters	LS	-	-	(441)
Storm Drainage	LS	-	-	(124)
Site Improvement	LS	-	-	(196)
Communication	LS	-	-	(244)
Subtotal				7,837
Contingency (5.00%)				392
Total Contract Cost				8,229
Supervision, Inspection & Overhead (5.50%)				453
Total Request				8,682
Total Request (Rounded)				8,700
Installed Equipment - Other Appropriations				(0)

10.Description of Proposed Construction Construct a 200 person barracks including classrooms, a headquarters and supply building with small arms vault, dining facilities for 200 personnel, a 4-bay maintenance building, a 50 person barracks and a 25 person barracks. Supporting facilities will include utility services, fire protection systems, roads, walks, parking, communications and site improvements. Heating is supplied by individual oil units. Air conditioning individually supplied to each building. Air conditioning: 40 tons.

11. REQUIREMENT: 275 PN ADEQUATE: None SUBSTANDARD: None

PROJECT: Construct a 200 person barracks, 50 person barracks, 25 person barracks, dining building, headquarters and supply building with small arms vault, and a 4-bay maintenance building.

REQUIREMENT: This project is required to provide living quarters and administrative support for 200 students and 50 instructors of the West Virginia Army National Guard, which is expanding its complement of troops which will use this facility.

CURRENT SITUATION: The present barracks, mess hall, and headquarters buildings are adequate only for the present forces. The West Virginia Army National Guard is in the process of expanding its complement of troops which

1. COMPONENT USAR	FY 19__ MILITARY CONSTRUCTION PROJECT DATA	2. DATE Rev 17Mar86

3. INSTALLATION AND LOCATION Wetzel County Memorial USAR Center New Martinsville, WV	4. PROJECT TITLE Expand 25-M to 60-M USAR Center with 2-Bay OMS

5. PROGRAM ELEMENT	6. CATEGORY CODE 171-40	7. PROJECT NUMBER	8. PROJECT COST ($000) $1290.6

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES:				1013.3
Addition to USARC Training Bldg	SF	6015	77.00	(463.8)
Addition to Organizational Maint Shop	SF	1877	88.00	(245.6)
Alterations/Rehab of Existing Space	SF	5735	53.00	(303.9)
SUPPORTING FACILITIES (15%)				152.0
TOTAL CONSTRUCTION COST				1165.3
Contingency (5%)				58.3
Supervision and Administration (5.5%)				67.0
TOTAL PROJECT COST				1290.6

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Design will provide the most economical construction of an expansion complete with integrated site improvement to provide a permanent, aesthetically pleasing spatial enclosure to house the functional requirement stated herein.

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11. REQUIREMENT: 7,892 SF. Adequate: 0 SF. Substandard: 5,735 SF.

PROJECT: Addition to an existing 25-member USARC with one bay Organizational Maintenance Shop (OMS) to convert it to a 60-member USARC with two bay OMS.

REQUIREMENT: Facilities to permit 1st Platoon, D Company, 463d Engineer Battalion (C) (Hvy) to meet its current and mobilization missions. The site upon which the present 25-member USARC was constructed was to afford space for the required future expansion.

CURRENT SITUATION: Present facilities are inadequate because of space shortages and the space that is available is not tailored to the needs of the unit. The shortage of space required to support the unit's equipment and training requirements has impacted negatively on the unit's readiness posture.

IMPACT IF NOT PROVIDED: The existing building will continue in use with a resultant adverse effect upon the unit's ability to achieve and maintain adequate unit and individual training and readiness.

1. COMPONENT USAR	FY 19__ MILITARY CONSTRUCTION PROJECT DATA	2. DATE 27Mar86

3. INSTALLATION AND LOCATION USARC/OMS/AMSA, Parkersburg, WV	4. PROJECT TITLE Construct 200-M USARC/OMS/AMSA

5. PROGRAM ELEMENT 55994A	6. CATEGORY CODE 171-40	7. PROJECT NUMBER	8. PROJECT COST ($000) $3,306

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES:				2080
Addition to Training Center	SF	17229	70.00	(1206)
Alteration to Training Center	SF		35.00	(0)
Addition to Maintenance Shop	SF	12486	70.00	(874)
Alteration to Maintenance Shop	SF	0	35.00	(0)
SUPPORTING FACILITIES:				312
TOTAL CONSTRUCTION COST				2392
Contingencies (5%)				120
Supervision and Administration (5.5%)				138
Site Acquisition (10 acres)				250
TOTAL PROJECT COST				2900
Inflation Escalation to FY 89				406
TOTAL				3306

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Design will provide the most economical construction with integrated site improvement to provide a permanent, aesthetically pleasing spatial enclosure to house the functional requirement stated herein.

11. REQUIREMENT: 29,715 SF. Adequate: 0 SF. Inadequate: 12,993 SF.

PROJECT: Construction will provide a new US Army Reserve center with Organizational Maintenance Shop, Area Maintenance Support Activity and parking areas required for mission training by the units assigned to this location.

REQUIREMENT: This facility will provide adequate training facilities for the unit and maintenance shop, allowing them to train as an entity, to develop team work and the necessary cohesion required for mission readiness.

CURRENT SITUATION: Current facility is a government-owned US Army Reserve center occupied by Company C, 463d Engineer Battalion and two US Naval Reserve ship units. This facility will not provide the minimal, sufficient space for administrative, instructional, assembly, storage, or maintenance function requirements of the US Army Reserve. The existing site of 3.5 acres will not accommodate expansion of the existing facility to meet the US Army Reserve requirements.

IMPACT IF NOT PROVIDED: The US Army Reserve units will not be able to properly conduct training and maintenance to be prepared to meet their readiness and mobilization missions with the continued use of substandard facilities.

1. COMPONENT USAR	FY 19__ MILITARY CONSTRUCTION PROJECT DATA	2. DATE 21Mar86

3. INSTALLATION AND LOCATION Kingwood, WV	4. PROJECT TITLE New 100-M USARC/OMS

5. PROGRAM ELEMENT 55994A	6. CATEGORY CODE 171-40	7. PROJECT NUMBER	8. PROJECT COST ($000) $1,389

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES:				934
Addition to Training Center	SF	11406	70.00	(798)
Alteration to Training Center	SF	0	35.00	(0)
Addition to Maintenance Shop	SF	1953	70.00	(136)
Alteration to Maintenance Shop	SF	0	35.00	(0)
SUPPORTING FACILITIES:				140
TOTAL CONSTRUCTION COST				1074
Contingencies (5%)				53
Supervision and Administration (5.5%)				62
Site Acquisition				200
TOTAL PROJECT COST				1389

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Design will provide the most economical new construction complete with integrated site development to provide a permanent, aesthetically pleasing, spatial enclosure to house all functional requirements.

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11. REQUIREMENT: 13,359 SF. Adequate: 0 SF. Substandard: 0 SF.

PROJECT: Construction will provide a new USAR Center, Organizational Maintenance Shop and parking areas required for mission training by the units assigned to this location.

REQUIREMENT: This facility will provide adequate training facilities for all assigned units, allowing them to train as an entity, to develop team work, and the necessary cohesion required for unit readiness.

CURRENT SITUATION: Current facility is a leased USAR center occupied by the 646th Quartermaster Company (-). This facility does not have even minimally sufficient space for administrative, instructional, assembly, storage, or maintenance functions.

IMPACT IF NOT PROVIDED: The units will not be able to properly conduct training and be prepared to meet their readiness and mobilization objectives with the continued use of substandard facilities.

1. COMPONENT USAR	FY 19__ MILITARY CONSTRUCTION PROJECT DATA	2. DATE 21Mar86

3. INSTALLATION AND LOCATION Elkins, WV	4. PROJECT TITLE New 100-M USARC/OMS

5. PROGRAM ELEMENT 55994A	6. CATEGORY CODE 171-40	7. PROJECT NUMBER	8. PROJECT COST ($000) $1,016

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES:				642
Addition to Training Center	SF	9178	70.00	(642)
Alteration to Training Center	SF	0	35.00	(0)
Addition to Maintenance Shop	SF	0	70.00	(0)
Alteration to Maintenance Shop	SF	0	35.00	(0)
SUPPORTING FACILITIES:				96
TOTAL CONSTRUCTION COST				738
Contingencies (5%)				36
Supervision and Administration (5.5%)				42
Site Acquisition				200
TOTAL PROJECT COST				1016

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Design will provide the most economical new construction complete with integrated site development to provide a permanent, aesthetically pleasing, spatial enclosure to house all functional requirements.

11. REQUIREMENT: 9,178 SF. Adequate: 0 SF. Substandard: 0 SF.

PROJECT: Construction will provide a new USAR Center, Organizational Maintenance Shop and parking areas required for mission training by the units assigned to this location.

REQUIREMENT: This facility will provide adequate training facilities for all assigned units, allowing them to train as an entity, to develop team work, and the necessary cohesion required for unit readiness.

CURRENT SITUATION: Current facility is a leased USAR center occupied by Detachment 1, 646th Quartermaster Company. This facility does not have even minimally sufficient space for administrative, instructional, assembly, storage, or maintenance functions.

IMPACT IF NOT PROVIDED: The units will not be able to properly conduct training and be prepared to meet their readiness and mobilization objectives with the continued use of substandard facilities.

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1. COMPONENT USAR	FY 19__ MILITARY CONSTRUCTION PROJECT DATA	2. DATE 21Mar86

3. INSTALLATION AND LOCATION Rainelle, WV	4. PROJECT TITLE Construct 200-M USARC/OMS

5. PROGRAM ELEMENT 55994A	6. CATEGORY CODE 171-40	7. PROJECT NUMBER	8. PROJECT COST ($000) $2,387

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES:				1718
Addition to Training Center	SF	18124	70.00	(1268)
Alteration to Training Center	SF	0	35.00	(0)
Addition to Maintenance Shop	SF	6432	70.00	(450)
Alteration to Maintenance Shop	SF	0	35.00	(0)
SUPPORTING FACILITIES:				257
TOTAL CONSTRUCTION COST				1975
Contingencies (5%)				98
Supervision and Administration (5.5%)				114
Site Acquisition				200
TOTAL PROJECT COST				2387

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Design will provide the most economical new construction complete with integrated site development to provide a permanent, aesthetically pleasing, spatial enclosure to house all functional requirements.

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11. REQUIREMENT: 24,556 SF. Adequate: 0 SF. Substandard: 0 SF.

PROJECT: Construction will provide a new USAR Center, Organizational Maintenance Shop and parking areas required for mission training by the units assigned to this location.

REQUIREMENT: This facility will provide adequate training facilities for all assigned units, allowing them to train as an entity, to develop team work, and the necessary cohesion required for unit readiness.

CURRENT SITUATION: Current facility is a 25-member USAR center which is overcrowded and severely damaged from subsidence. This facility does not even provide minimally sufficient space for administrative, instructional, assembly, storage, or maintenance functions of the 511th Ordnance Company assigned to this location.

IMPACT IF NOT PROVIDED: The units will not be able to properly conduct training and be prepared to meet their readiness and mobilization objectives with the continued use of substandard facilities.

ARNG	FY 19 88 MILITARY CONSTRUCTION PROJECT DATA	19 MAR 1986

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
CAMP DAWSON (KINGWOOD), WEST VIRGINIA	TRAINING FACILITIES, PHASE I

5. PROGRAM ELEMENT	6 CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
55896A	720	1150	763

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
TRAINING FACILITY (PHASE I				680
BARRACKS 65 PERSON (1)..................	SF	14,188	40.04	(568)
BN HEADQUARTERS BLDG (1)...............	SF	2,493	45.00	(112)
SUPPORTING FACILITIES		-	-	47
SITE PREPARATION	LS	-	-	(10)
GRADING AND SEEDING....................	AC	1.5	2500	(1)
SIDEWALKS..............................	SF	580	1.75	(1)
ACCESS ROADS...........................	SY	244	1300	(3)
OFF-STREET PARKING.....................	SY	1,075	930	(10)
UTILITIES, WATER, SEWER. ELEC & TELECOM	LS	-	-	(19)
SUBTOTAL				727
CONTINGENCY (5%)...........................				36
SUPERVISION, INSPEC. OVERHEAD (1.50) (NON-ADD)				(11)
TOTAL REQUEST..............................				763
EQUIPMENT PROVIDED BY OTHER APPR (NON-ADD)	LS			(10)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Specially designed heated/insulated facilities of permanent masonry type construction, with concrete block units and concrete floors. The 65-person barracks and battalion headquarters building will be one-story structure with wood roof trusses, sheating and asphalt shingle roofs. All structures with mechanical and electrical equipment which will utilize the most economical source of energy at the site location. Utility connections are included in this construction.

Air conditioning - None.

11. REQUIREMENT: 16,681 SF. ADEQUATE: 0 SUBSTANDARD: 0

Project: This project will support the units of the West Virginia National Guard to perform the training requirements in support of reserve missions.

REQUIREMENT: This proposed project is requested to provide 16,681 SF for quarters and required space to permit the unit personnel to conduct administrative and command management training. This training, housing and administrative space is minimum essential areas to effectively train and accomplish the combat readiness objectives.

CURRENT SITUATION: Existing enlisted quarters are insufficient to support training conducted at Camp Dawson. Currently, there are quarters available for only 106 personnel. The existing 1280 SF. frame building serving as a battalion headquarters is totally inadequate and must be replaced. The lack of adequate qfacilities limits the number of personnel and types of units able to train at one time.

IMPACT IF NOT PROVIDED: Limited training will be continued at greater expense and at reduced levels required for readiness.

ARNG	FY 1988 MILITARY CONSTRUCTION PROJECT DATA	19 MAR 1986

3. INSTALLATION AND LOCATION BUCKHANNON, WEST VIRGINIA	4. PROJECT TITLE ORGANIZATIONAL MAINTENANCE SHOP ADDITION AND ALTERATION

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
55896A	214	1160	406

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
PRIMARY FACILITIES				305
BUILDING ADDTION........................	SF	4221	62.00	(262)
BUILDING ALTERATIONS....................	SF	760	45.00	(34)
FLAMMABLE MATERIAL STORAGE..............	LS	150	62.00	(9)
SUPPORTING FACILITIES	-	-	-	82
OIL AND GREASE RACK.....................	LS	-	-	(25)
WASH RACK...............................	LS	-	-	(10)
CONCRETE RAMP AND PADS..................	LS	-		(22)
FUEL LINES & OIL STOR...................	LS		-	(8)
UTILITIES...............................	LS	-	-	(17)
SUBTOTAL				387
CONTINGENCY (5%)........................				19
FEDERAL CONTRIBUTION....................				406
SUPERVISION AND OVERHEAD (1.65) NON-ADD.....		-	-	(7)
TOTAL REQUESTED.........................				406
EQUIPMENT FROM OTHER APPR. (NON-ADD)........				(1)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Project consists of an addition of two work bays, bulk equipment storage, tool room, battery room and supply room and alterations to the existing building. One new work bay will be oversized for engineer equipment. Addition shall be constructed of brick faced concrete masonry to match existing and surrounding buildings. Support facilities include wash platform, lube rack and concrete ramps to the work bays.
Air Conditioning - 1 1/2 tons

11. REEQUIREMENT 7308 SF. ADEQUATE 2177 SF. SUBSTANDARD 760 SF.
PROJECT: An addition to the maintenance shop to provide organizational maintenance for vehicles and equipment assigned to units supported by this facility.
REQUIREMENT: An additional facility requirement of 4221 SF and alterations of 760 SF is requested to provide cost effective organizational level maintenance be performed on vehicles authorized by TOE/TDA at the supported units. Alterationa to existing structure will provide required space for the foreman's office, break room mech/custodial room, locker room and men's and women's toilet.
CURRENT SITUATION: The existing three-bay shop consists of 2866 SF and was constructed in 1962. The facility has no bulk equipment storage, tool room, supply room, latrines, break room or locker room. Work bays are undersized. The shop does not have a lube/oil rack or capcbilities to collect polluted water. The existing facility is structurally sound and can be effectively modernized.
IMPACT IF NOT PROVIDED: The quality of work will decrease due to inadequate and deficient work and storage areas to perform administrative and maintenance duties.

QUESTION. What more can be done to accelerate the construction of West Virginia Army Reserve and Army National Guard facilities in response to language included, at my request, in the report accompanying the Fiscal Year 1986 Military Construction Appropriation Bill and the urgings of my colleagues?

ANSWER. Actions on projects in West Virginia are being processed as expeditiously as possible, and are on schedule. No assistance from you is needed at this time.

ARMY RESERVE CENTERS

QUESTION. A site has now been agreed upon for the Rainelle Army Reserve Center replacement center. What can be done to facilitate the design and construction of this facility? Likewise, what can be done to accelerate the design and construction of the New Martinsville, Parkersburg, and Kingwood Army Reserve Centers? What is the latest status of the new Ripley Army Reserve Center for which I secured authorization in FY 1985 and funding in FY 1986?

ANSWER. Actions on projects in West Virginia are being processed as expeditiously as possible.

Rainelle-FY 91. The design can be initiated upon completion of the land exchange agreement to acquire the site.

New Martinsville-FY 88. The design of the expansion from 25-member to 60-member is proceeding to facilitate construction in the FY 88 program. This project was initially a candidate for the FY 89 program.

Parkersburg-FY 89. The project is being intensively managed to facilitate construction in the FY 89 program. This project was initially a candidate for the FY 90 program.

Kingwood-FY 91. The project design will be initiated upon completion of the site acquisition.

Ripley-FY 85. A contract was awarded in January 1986 for the expansion of the 25-member to 150-member USARC with OMS. The contract amount was $1,474,599.00 and a notice to proceed is anticipated not later than April 1986.

QUESTION. Mr. Secretary, two years ago the Committee, at my request, included language in the report accompanying the Fiscal Year 1985 Defense Appropriations Bill, directing that no action be taken to transfer the Military Entrance Processing Station or its personnel from Beckley, West Virginia. I remain firmly convinced that this station and its personnel should not be moved from Beckley because such a transfer would have a serious adverse impact on the local economy, not only in jobs lost but also in revenues associated with the Station. What is the status of the proposed new facility for the Beckley Military Entrance Processing Station? Please provide for the record an updated schedule, including significant milestone events, leading to full realization of their proposal.

ANSWER. The Military Entrance Processing Station will remain at Beckley. The present lease expires in July 1987. During the week of 28 March 1986, a requirements package will be dispatched from the District Engineer Office to the Division Engineer, North Atlantic Division, which includes a list of bidders for space at Beckley. In turn, the package will be dispatched to the Military Entrance Processing Command for an April or May 1986 approval.

SECRETARY OF THE ARMY PERSONAL RESPONSE

QUESTION. Mr. Secretary, I trust that you and your colleagues will keep me personally informed on all matters relating to the Army, Army Reserve, and Army National Guard in West Virginia. May I have your assurances on that.

ANSWER: Senator Byrd, you have my assurance that we will keep you personally informed.

QUESTIONS SUBMITTED BY SENATOR SASSER

SPECIAL OPERATIONS FORCES

QUESTION: For the Record, What are the Army Special Operation Force elements and what is budgeted for them in fiscal year 1987? What was provided in fiscal year 1986?

ANSWER: Army Special Operation Force elements include Special Forces, Psychological Operations, Civil Affairs, Ranger, and Special Operations Aviation Units. Each type unit possesses its own unique capabilities and characteristics. Although each performs separate functions, the units support and complement each other in the conduct of special operations.

Army accounting and costing methods do not permit specific identification of funding for each of the above elements. Total funds provided in fiscal year 1986 and total funds budgeted for fiscal year 1987 by appropriation for all elements are illustrated below:

SUMMARY($M)	FISCAL YEAR 86	FISCAL YEAR 87
RDTE	3	31
OPA	29	51
APA	2	4
(SUBTOTAL PROCUREMENT*)	31	55
OMA	35	52
MPA	202	220
MCA	44	37
AC(SUBTOTAL)	315	395
OMAR	14	16
RPA	84	87
(SUBTOTAL USAR)	98	103
OMNG	15	15
NGP	33	33
(SUBTOTAL NAT'L GUARD)	48	48
TOTAL	461	546

*Includes Aircraft, AMMO

ARMY MUNITIONS STOCKPILE

QUESTION. It has been reported that, while the Army is buying a number of new weapons systems, you are seriously deficient in stockpiling munitions. For instance, I have read in the press that some units in Korea have only a three day supply of ammunition. Some have alleged that your munitions stockpile is getting worse. Is the Army munitions stockpile as deficient as some have reported?

ANSWER. No. Relative to the units in Korea having about 3 days of supply on hand, our readiness and distribution policy requires that units have a basic load of ammunition on hand at all times for operational emergencies. The Composition and number of days of supply in the basic load is mission dependent and normally equates to 3 to 5 days of supply. Additional stocks are stored in the theater for resupply to the units after basic load is expended. The Army worldwide aggregate stockpile equates to about(deleted)of supply, but can be more or less when considering individual munition items.

ARMY MUNITIONS STOCKPILE

QUESTION. It has been recommended that munition supply levels should be increased to a level which would provide enough ammunition in storage to last from the start of hostilities until the nation's industry can be mobilized sufficiently to sustain a prolonged conflict. Do you agree that such an increase in the stockpile is called for?

ANSWER. Yes. It is imperative that the U.S. Forces be ready to expell the envisioned threat. To do this requires that we have an adequate stockpile to fill operational needs until production can catch up with demands. Funding constraints have precluded achieving this objective and will continue for the foreseeable future. In the meantime, we procure munitions that will achieve the must equitable and balanced level of firepower and sustainability within available funding. The amount of the various types of munitions that need to be programed for stockpiling must consider the continued programed production base status and the production lead times that will vary with the complexity of the munitions being produced. Hot or warm production bases are capable of increasing production for mobilization with minimum delays, whereas cold production bases may require extended periods of time. In either case, the stockpile must be adequate to compensate for the time needed to obtain mobilization production capability.

CONCLUDING REMARKS

Senator STEVENS. I assured the Secretary and General Wickham we have made a commitment we would try to finish the overview hearings in 2 hours so that you can go over to the business you have to continue. You have delivered us a good message about the improvement in the Army. Everyone in the country ought to know about it. I hope you are doing your best to explain it.

When you come to Fairbanks and Anchorage, I am sure they will be interested there with the increase in military presence there. It will be a very interesting thing to see the kind of people who will join their community and also in New York with the light division.

These are the kind of people who will make good neighbors and will get greater support for the Army in the years ahead.

Thank you very much.

SUBCOMMITTEE RECESS

[Whereupon, at 12 noon, Monday, February 24, the subcommittee was recessed, to reconvene at the call of the Chair.]

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 1987

TUESDAY, MARCH 4, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:15 a.m., in room SD-138, Dirksen Senate Office Building, Hon. Ted Stevens (chairman) presiding.

Present: Senators Stevens, Andrews, Kasten, D'Amato, Rudman, Proxmire and Sasser.

DEPARTMENT OF DEFENSE

UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

STATEMENT OF HON. DONALD A. HICKS, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

OVERVIEW OF RESEARCH AND DEVELOPMENT

OPENING STATEMENT OF SENATOR STEVENS

Senator STEVENS. Good morning. I apologize for the delay.

We are here today to continue the Defense Subcommittee's review of the fiscal year 1987 defense budget. This hearing is to receive an overview of the Department of Defense research and development budgets. Research and development now comprises some 12 percent of the Department's budget. The fiscal year 1987 budget request would raise that to more than 13 percent.

BUDGET REQUEST

The $41.9 billion request is up by approximately 18.6 percent from enacted defense appropriations for the current fiscal year. Calculated from the post-Gramm-Rudman sequestered baseline, the increase is $8.3 billion or 24.7 percent over fiscal year 1986.

Most of the real growth contained in the R&D request is for the Strategic Defense Initiative, strategic programs, tactical programs and classified programs. Increases for the technology base, advanced technology development, intelligence and defensewide mission support are more modest.

Today's hearing will focus on the science and technology program, joint service research and developments and international (NATO) armaments cooperation. SDI funding will be covered in four separate hearings, the first of which is tomorrow morning.

In the past we have occasionally found it necessary to close the hearing to cover classified material. If it is necessary to go into such matters, we will schedule separate hearings rather than close this hearing.

COMPARATIVE SUMMARY AND OUTLAYS

For the record, I would like the Department to insert a comparative summary of research and development budget authority requested and the associated outlays similar to those in the back of your statement for total obligational authority.

[The information follows:]

COMPARATIVE SUMMARY OF RESEARCH AND DEVELOPMENT BUDGET AUTHORITY

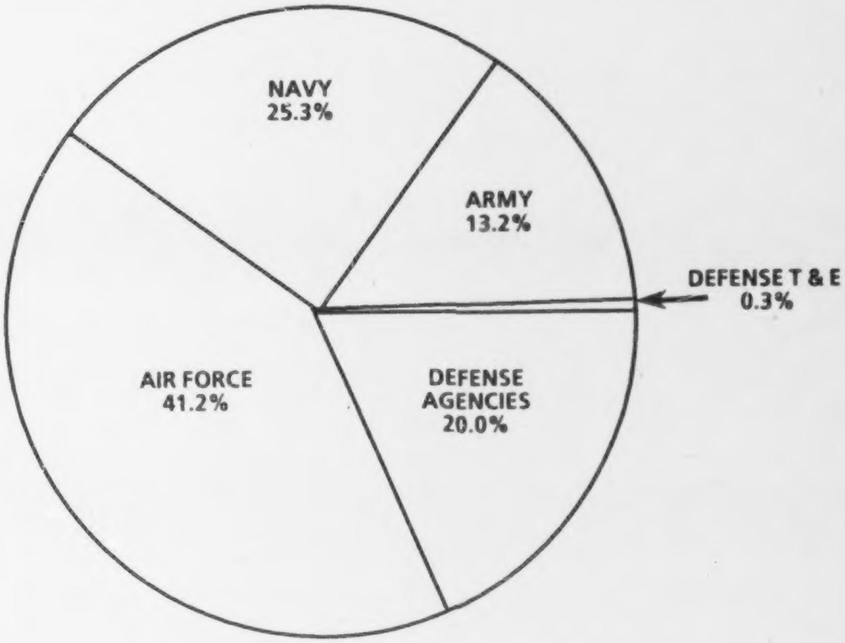
A comparative summary of research and development Budget Authority (BA) requested similar to those in back of the R&D statement for Total Obligational Authority (TOA) is provided. The RDT&E BA and TOA fiscal data are the same for FY 1986 and FY 1987. Very minor differences occur in FY 1985 due to financial adjustments. The summary of RDT&E Outlays by Component shown on the following charts reflects data for FY 1985 (actual) and FY 1986 and FY 1987 (planned):

RDT&E BY COMPONENT

BUDGET AUTHORITY ($ MILLIONS)

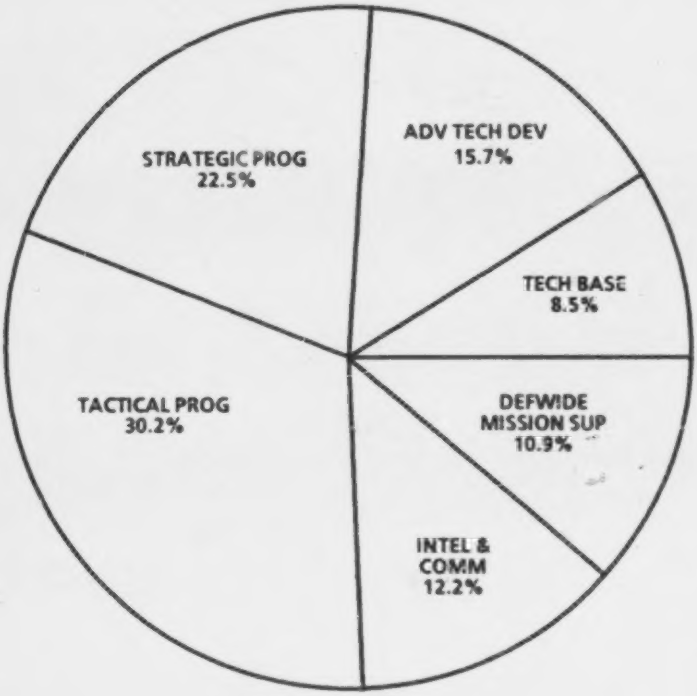
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Army	4357.2	13.9	4841.5	13.7	5550.3	13.2
Navy	9197.4	29.4	10076.9	28.4	10586.8	25.3
Air Force	13484.7	43.0	13787.4	38.9	17275.4	41.2
Def Agencies	4229.2	13.5	6642.4	18.7	8364.3	20.0
Def T & E	59.0	0.2	118.5	0.3	141.8	0.3
Def OT & E	--	--	--	--	11.3	--
TOTAL RDT&E	31327.5	100.0	35466.7	100.0	41929.9	100.0



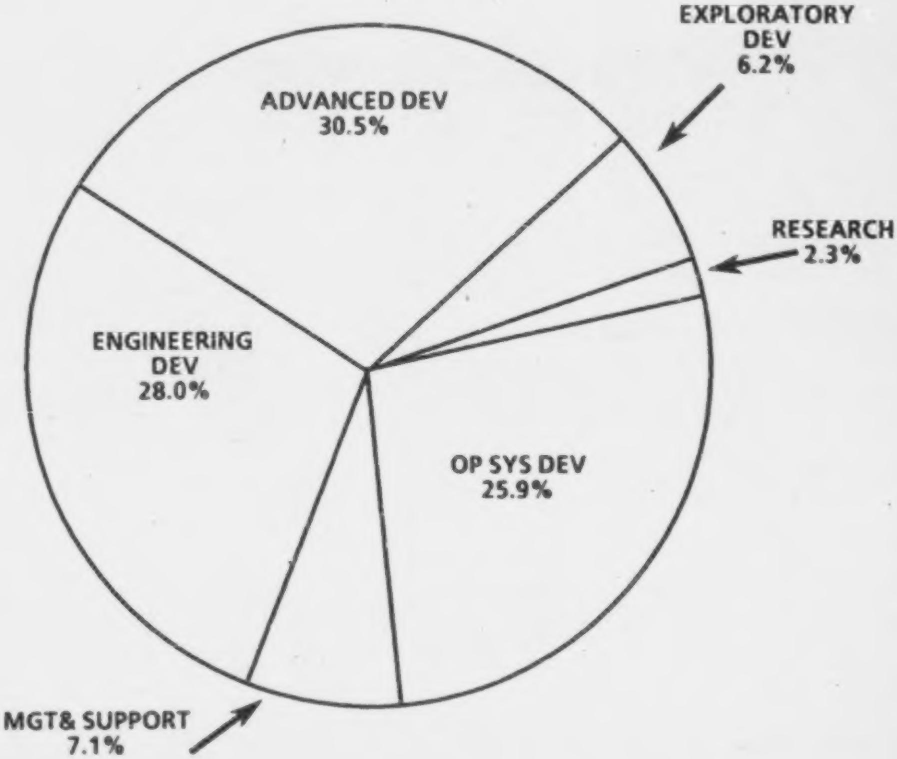
RDT&E BY BUDGET ACTIVITY
BUDGET AUTHORITY ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Technology Base	3171.3	10.1	3449.1	9.7	3585.3	8.5
Advanced Tech Dev	2785.7	8.9	4234.3	11.9	6574.7	15.7
Strategic Prog	8284.6	26.5	8054.4	22.7	9429.6	22.5
Tactical Prog	9255.0	29.5	10901.0	30.8	12671.5	30.2
Intel & Comm	3967.7	12.7	4703.4	13.3	5102.9	12.2
Defwide Mission Sup	3863.2	12.3	4124.5	11.6	4566.0	10.9
TOTAL RDT&E	31327.5	100.0	35466.7	100.0	41929.9	100.0



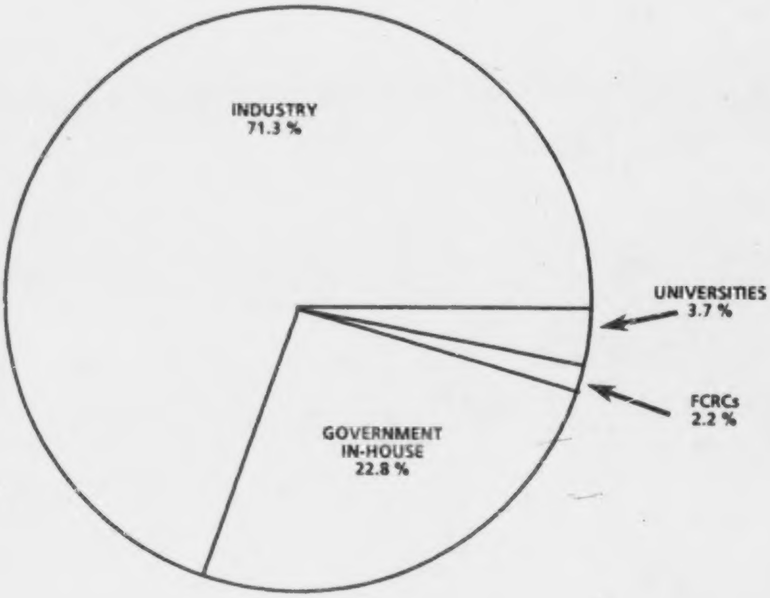
RDT&E BY R&D CATEGORY
BUDGET AUTHORITY ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Research	860.1	2.7	1024.2	2.9	985.8	2.3
Explor Dev	2311.3	7.4	2424.9	6.8	2599.4	6.2
Adv Dev	6856.2	21.9	9875.3	27.8	12775.8	30.5
Engin Dev	10661.1	34.0	10149.3	28.6	11717.5	28.0
Mgt & Sup	2528.3	8.1	2611.1	7.4	2972.8	7.1
Op Sys Dev	8110.5	25.9	9382.0	26.5	10878.5	25.9
TOTAL RDT&E	31327.5	100.0	35466.7	100.0	41929.9	100.0



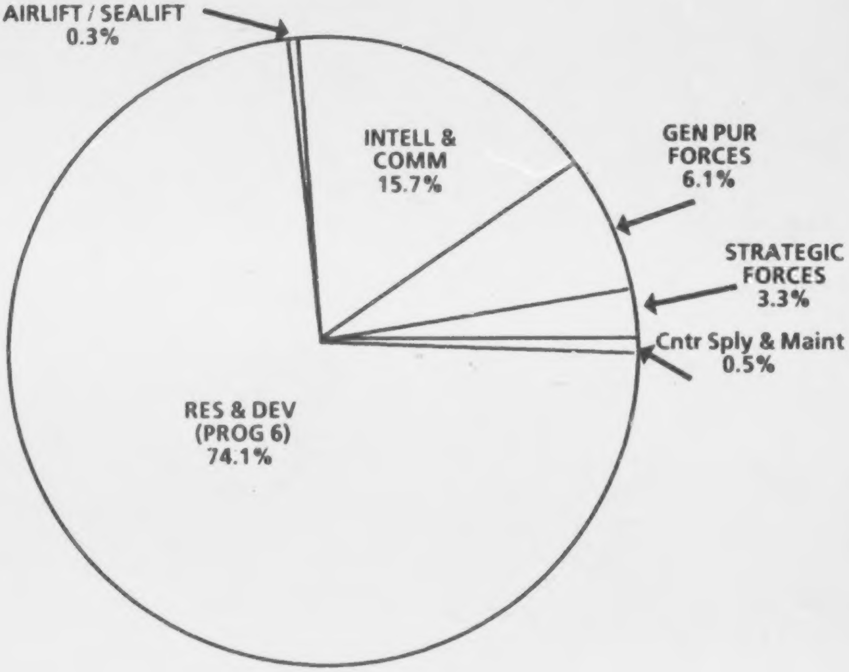
RDT&E BY PERFORMER
BUDGET AUTHORITY ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Industry	22308.0	71.2	25418.0	71.7	29895.8	71.3
Govt In-House	7181.2	22.9	7940.9	22.4	9570.7	22.8
Federal Contract Research Ctrs (FCRCs)	700.4	2.2	764.7	2.2	912.8	2.2
Universities	1137.9	3.7	1343.1	3.8	1550.6	3.7
TOTAL RDT&E	31327.5	100.0	35466.7	100.0	41929.9	100.0



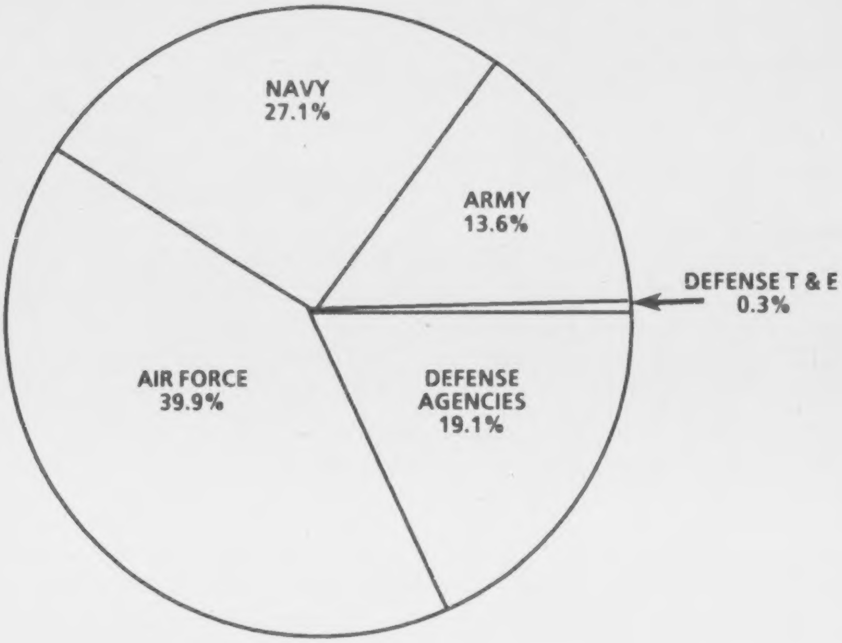
RDT&E BY DEFENSE PROGRAMS
BUDGET AUTHORITY ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Strat Forces	815.1	2.6	1109.4	3.1	1392.4	3.3
Gen Purp Forces	1986.3	6.4	2016.4	5.7	2578.9	6.1
Intel & Comm	5041.7	16.1	5931.1	16.7	6589.0	15.7
Airlift/Sealift	36.0	0.1	80.2	0.2	112.2	0.3
Guard & Reserve	--	--	--	--	4.5	--
R & D (Prog 6)	23215.9	74.1	26084.7	73.6	31051.4	74.1
Cntr Sply & Maint	217.4	0.7	235.2	0.7	192.2	0.5
Trng, Med, Other	5.2	--	5.2	--	4.8	--
Admin & Assoc Act	5.2	--	--	--	--	--
Spt Other Nations	4.7	--	4.5	--	4.5	--
TOTAL RDT&E	31327.5	100.0	35466.7	100.0	41929.9	100.0



RDT&E BY COMPONENT
OUTLAYS ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Army	3949.9	14.6	4217.9	14.2	4408.8	13.6
Navy	8053.6	29.7	8786.9	29.7	8765.2	27.1
Air Force	11572.6	42.7	11632.5	39.3	12882.9	39.9
Def Agencies	3471.7	12.8	4910.4	16.6	6160.5	19.1
Def T & E	55.1	0.2	69.3	0.2	99.8	0.3
Def OT & E	--	--	--	--	5.0	--
TOTAL RDT&E	27102.9	100.0	29617.0	100.0	32322.2	100.0



INTRODUCTION OF UNDER SECRETARY HICKS

Senator STEVENS. Today we are pleased to hear testimony from Donald A. Hicks, Under Secretary of Defense for Research and Engineering.

Dr. Hicks, we welcome you to the hearing this morning. This is the first opportunity we have had to hear you testify since you became the Under Secretary last year.

We will place your full statement in the record and welcome any additional comments and summary of your formal statement, after which we will have questions for you.

Again, welcome to the subcommittee. We appreciate the fact that you are here. Please proceed.

BUDGET REQUEST FOR FORCE MODERNIZATION AND READINESS

Dr. HICKS. Mr. Chairman, I am pleased to be here with you today to discuss the Department of Defense's RDT&E program for fiscal year 1987.

Our fiscal year budget request for $42 billion represents the resources needed to turn technological progress into force modernization and readiness. This year in the face of undiminished threat and severe budgetary pressures, a cooperative approach to consideration of these issues is needed now as never before.

With your permission, I would like to submit for the record my printed statement on the fiscal year 1987 Department of Defense program for research and development and then summarize the highlights.

The $42 billion, as you pointed out, includes funds for both C^3I and the Strategic Defense Initiative. You will hear about those separately. I will be glad to answer any questions concerning those programs. Assistant Secretary Latham will be talking about C^3I before you and General Abrahamson will be talking about SDI.

STRATEGIC FORCE MODERNIZATION

Our strategic force modernization includes the three legs of the Triad. The sea-based leg is going very well. Our seventh Trident boat began sea trials in September. We are on schedule with the development of the Trident II D–5 missile with flight tests scheduled to begin in 1987 and IOC set for 1989.

The achievement of these goals has continued on the maintenance of the requested levels of funding. We are pleased with the contributions these developments make to the capability of our most survivable leg of the Triad.

AIR-BASED LEG OF TRIAD

The air-based leg. The advanced cruise missile program is moving along well. Deployment on B–52's and later on B–1B's will significantly enhance the capability of military aircraft. By mid-1988 all 100 B–1B's will be delivered.

In the future, however, we must rely increasingly on the capabilities of the advanced technology bomber with its low visibility technology to maintain penetrating bomber effectiveness.

Details of the ATB program are classified, but it is proceeding smoothly toward a first test flight and production line.

LAND-BASED LEG OF TRIAD

The land-based leg of the Triad, Peacekeeper, has had ten extremely successful flight tests. We are intensifying our work on the search for a survivable basing mode. Among the promising options are superhard silos, "carry hard" basing and shallow tunnel option. All of these show encouraging technical progress and we are increasingly focusing on the issues of affordability.

Finally, the small ICBM will enter full-scale development later this year.

CONVENTIONAL FORCE MODERNIZATION

With the SDI and arms control, we are moving into an era where conventional deterrence takes on a new importance. We will have to rely on technology leveraging to meet future threats. For example, low observable technology shows promise for rendering large portions of the enemy's defense capability obsolete.

Currently we are exploiting new capabilities to detect, track, target and strike the enemy deep in his own territory. One component of this package of developmental programs, the joint surveillance target attack radar systems, JSTARS, entered full-scale development in September. JSTARS is a critical program which will provide us with all targeting data and battle execution.

This system, along with the precision location strike system, PLSS, and the advanced synthetic aperture radar systems, ASARS, will provide real time intelligence information to the theater commanders to prevent surprise and in the event of enemy attack, to provide targeting information necessary to engage enemy forces long before they reach the front.

The long-range strike part of this package includes the Army's tactical missile system, ATACMS, which is in the final phases of DSARC, to review and if this review is satisfactory, and I expect it to be, it should enter full-scale development shortly.

Also included is the Air Force/Army joint tactical cruise missile system, JTACMS, now in advanced development.

We believe this package of programs will make a large contribution to the Reagan administration priority of strengthening NATO's conventional defenses.

In addition, we are continuing our conventional force modernization program which encompasses a wide range of projects designed to greatly improve the warfighting capabilities of our land, air and naval forces.

LAND FORCES

For our land forces, modernization continues with the ongoing acquisition of new systems such as the Abrams M1A1 tank and the Bradley fighting vehicle.

NEW TECHNOLOGY DEVELOPMENTS

In new technology developments, the hypervelocity missile and the fiber optic guided missile, so-called FOG-M, offers promising new concepts for increasing effectiveness against many target classes.

AIR WARFARE

For air warfare we have a number of acquisition programs underway to improve our capability to perform counter-air, defense suppression and air-to-ground strike missions.

To improve our future capabilities, we are emphasizing such systems as the Advanced Medium Range Air-to-Air Missiles, AMRAAM, the Low Altitude Navigation and Targeting Infrared System for Night, LANTIRN, and we are in the early stages of developing Advanced Tactical Fighter, ATF, to help us retain air superiority over the Soviets.

NAVAL WARFARE

For naval warfare we have several programs underway to expand and improve the defense of our carrier battle groups, to improve our capabilities for antisubmarine warfare and to enhance the capabilities of our attack submarines.

An example of our developmental efforts in the latter area is the new SSN-21 program which will be critical in maintaining our advantage in attack submarine capability.

SCIENCE AND TECHNOLOGY

In science and technology we are providing the basic and applied research to maintain our technological lead over potential adversaries. Among our priority efforts are the strategic computing program, the very high-speed, integrated circuit, VHSIC, missile aircraft propulsion technology and advanced aircraft technology programs.

We are continuing our work with NASA on the technology needed to enable hypersonic flight.

BASIC RESEARCH NEEDS

In support of our basic research needs, we have initiated, with the support of Congress, the university research initiative to conduct research vital to national defense objectives.

INTERNATIONAL COOPERATION

In the international cooperation area the legislative packages sponsored by Senators Nunn and Quayle are especially welcomed in our efforts toward international cooperation.

Their initiatives have given armaments cooperation recognition as a viable alternative to national development, and they will certainly aid our efforts in the conventional forces area.

Our overall policy is to reduce the duplicative efforts and to draw on the technology and industrial capability of our allies to field the best and most cost-effective weapon system possible.

Last week I was in Brussels, working with the conference of national armaments directors of NATO and we signed off five statements of intent, at least three nations in each case, sometimes as many as eight or nine nations, to pursue jointly certain weapon systems or communications.

These included the stand-off airborne radar system for surveillance and target acquisition program which is tied to our JSTARS, the autonomous 155-millimeter precision guided munition program, the NATO identification system, the question and answer components of that system, the MISS terminal development program which will be tied to our Air Force's JMISS programs, a modular stand-off weapon program which is going to be a first, as far as I can tell, in getting cooperation in an area we desperately need, that is precision stand-off weapons for air-to-ground delivery, and developments to enhance the use of the Ada high order computer language project and its supporting environment in NATO.

MANAGEMENT INITIATIVE

In the management initiative area, because of our responsibility in my office for the early phases of the acquisition process, we preside over the process through which the broad line of our weapons acquisition program is defined.

We work closely with the Services to try to assure our investments in R&D will provide the biggest future payoffs in new equipment.

Over the last several months we have assembled in the Office of USDRE an outstanding new management team. All of these individuals bring exceptional professional credentials to their positions in Government. All have made substantial sacrifice to serve the Department of Defense and the Nation.

As you will meet them over the next several weeks, I am sure you will join me in the judgment that under their leadership our RDT&E resources will be ably managed.

That concludes my summary of my statement, Mr. Chairman. I will be glad to answer any questions that you have.

[The statement of Dr. Hicks follows:]

STATEMENT
by the
UNDER SECRETARY OF DEFENSE, RESEARCH and ENGINEERING

I. INTRODUCTION AND OVERVIEW

RESOURCE REQUIREMENTS

The FY 1987 budget request for research, development, test and evaluation contributes to a sustained effort to strengthen U.S. national security. It encourages and exploits technological developments for force modernization and provides continued technological advances to meet future threats.

Today, as a result of the Administration's judicious application of increased resources for defense, our forces are more capable of deterring aggression because of force modernization achievements and high leverage capability improvements resulting from the exploitation of our technological strength.

Notwithstanding these accomplishments, much remains to be done. Our FY 1987 Research and Development, Test and Evaluation (RDT&E) budget request will provide, within the limits of previously agreed-to minimal near term growth, the continuation of a process that is yielding essential improvements in our national security.

To accomplish these important objectives, we are presenting an FY 1987 RDT&E budget request of $42 billion. This represents 13% (12% if the Strategic Defense Initiative (SDI) is excluded) of the total DoD FY 1987 Budget Request. We believe that this budget request is a reasonable share of the DoD's total, and, within it, we have tried to provide balanced allocations among the competing demands for RDT&E resources.

R&D THREAT ASSESSMENT

The USSR devotes approximately 16% of its Gross National Product (GNP) to defense as compared to our own expenditure of about 6% of GNP. The military Research and Development (R&D) portion of Soviet investment has increased in real terms at an average rate of about 4% for each of the last 20 years. The Soviets are using these resources to exploit technology across a wide range of military missions. Their introduction of approximately 200 major systems every ten years, as well as a significant number of lesser modified systems for the past three decades, is convincing evidence of the intense and pervasive Soviet military development effort. Our intention has not been to match the Soviets weapon for weapon, but to continue to build upon our technology advantage to neutralize the Soviet numerical advantage.

The tremendous imbalance between the Soviet Union and the U.S. in the production of military hardware remains of great concern. As shown in Table I-1, the Soviets have maintained their significant numerical advantage in the production of military equipment in most weapon classes. The production of our NATO Allies offsets some of this imbalance, but the Warsaw Pact still enjoys significant numerical superiority.

The extent and thrust of the Soviet research, development, and acquisition

Table I-1. Production Ratios of Selected Weapons for NATO and Warsaw Pact Armed Forces, 1981-1985*

CATEGORY/ WEAPON	1981-85 Production Ratio		1985 Production Ratio	
	USSR/U.S.	WP/NATO	USSR/U.S.	WP/NATO
Strategic				
ICBMs	700/0	700/0	100/0	100/0
SLBMs	1.4/1	1.3/1	1.4/1	1.2/1
SSBNs	1.3/1	1.1/1	2/1	1/1
Ground Combat				
Tanks	3.0/1	2.0/1	2.1/1	1.8/1
Artillery (100 mm and over)	9.5/1	6.4/1	12.3/1	7.3/1
Ships				
Major Surface Combatants (over 900 tons)	0.7/1	0.5/1	1/1	0.8/1
Attack Submarines	1.4/1	0.9/1	2/1	1.2/1
Aircraft				
Tactical Combat Aircraft	1.7/1	0.9/1	2.2/1	1.0/1
Military Helicopters	2.7/1	1.1/1	2.4/1	2.2/1

* Does not include items produced for R&D.

effort intensifies the U.S. need to sustain modernization efforts and to further exploit our technological advantages. In addition, the competitive forces of a free society which stimulate innovation are important in keeping the Soviets from eroding our strength through their massive investment effort. In this regard, emphasis by the commercial sector on R&D investment has helped to limit Soviet versus U.S. asymmetry in expenditures for military research and development.

Our research and development program is designed to ensure the military capability to counter the threats posed by the Soviet Union and its Warsaw Pact Allies, as well as other potential adversaries. Our continuous process of threat assessment and evaluation of our capabilities to deal with the threat is an important component of our efforts to ensure that scarce resources are allocated to the highest priority areas.

RDT&E PROGRAM DEVELOPMENT

FY 1987 RDT&E investments are consistent with this Administration's overall defense priorities:

- To enhance nuclear deterrence, we are modernizing our strategic nuclear capabilities and their command and control assets.

- To increase our conventional deterrence, developments are stressed that will multiply conventional force capability and raise the nuclear threshold.

- To strengthen readiness and sustainability, the reliability and maintainability of weapons and support systems are being improved.

- To support the Department's emphasis on recruiting and retaining quality people, we are insisting on system designs that enhance the "person-in-the-loop" contribution to system performance.

- To maintain and revitalize our alliances and obtain greater returns from our combined resources, we are increasing emphasis on cooperative research and development with our allies. Specifically, we are directing a major part of this emphasis to early deployment of systems employing emerging technologies.

The remainder of this chapter will highlight the important elements of our program.

Strategic Force Modernization

We are proceeding with a force modernization program that is yielding significant improvements to our strategic triad.

We continue to be pleased with the progress of the modernization of the sea-based leg of the triad. The seventh Trident boat began sea trials in September, and our Trident II (D-5) Submarine Launched Ballistic Missile (SLBM) development program is meeting its objectives. An aggressive flight test program will begin in 1987, with the Initial Operational Capability (IOC) goal established for late 1989.

The capability of our strategic bomber forces will be significantly enhanced with the delivery of all 100 B-1Bs by mid-1988. In the meantime the effectiveness of our B-52 fleet has been augmented by equipping it with over 1500 Air Launched Cruise Missiles (ALCMs).

The next few years promise major improvements in the bomber leg of our triad. Deployment of the Advanced Cruise Missile (ACM), with its added range and improved survivability, will increase the capability of our B-52s to reach Soviet targets from extended ranges. Later employment on the B-1B will enable the B-1 to transition to an effective shoot-and-penetrate role.

As Soviet defenses become more capable, however, we will rely increasingly on the Advanced Technology Bomber (ATB), with its low observable technologies, to maintain penetrating bomber effectiveness against critical Soviet targets, such as the growing number of strategic relocatable targets. Details of progress and schedule for the ATB program remain classified, but, to date, no significant technical problems have emerged to slow our work. The program is proceeding smoothly toward the first ATB test flight and a production decision.

For the third leg of our strategic triad, land-based Intercontinental Ballistic Missiles (ICBMs), the immediate future may be something of a crossroads. Three years ago the Scowcroft Commission recommended the deployment of 100 M-X missiles (the Peacekeeper) in existing Minuteman silos, the development of a Small ICBM (SICBM), and the aggressive pursuit of strategic arms control. Now, as we enter 1986, we have Congressional approval for only 50 Peacekeeper missiles, the requirement to develop an alternative survivable basing mode for a second 50 Peacekeepers, an ongoing advanced development program for the SICBM, and we have not yet completed the difficult process of achieving strategic arms control with the Soviet Union.

To date, we have had ten successful flight tests of the Peacekeeper, and the program continues on schedule. Work continues on the SICBM with plans to enter full scale development this year. In parallel, we are proceeding with our evaluations of survivable basing modes for both missiles. Significant potential exists with the hard mobile concept for the SICBM and on superhard silos for Peacekeeper. SICBM in hard mobile basing can be made survivable. The main challenge is its affordability.

The quickest and least expensive way to improve ICBM effectiveness is with Peacekeeper. The minimum cost approach is the original Scowcroft recommendation--deployment in existing Minuteman silos. However, additional survivability can be obtained by deploying the Peacekeeper in superhard silos. This will force the Soviets to employ low confidence tactics or to develop specialized warheads for their ICBMs if they wish to threaten Peacekeeper. We are also examining several additional basing modes including the "carry hard" basing mode. This mode deceptively moves encapsulated missiles among many low cost aim points. If "carry hard" proves feasible, we could provide additional survivability against any foreseeable Soviet threat.

The future therefore confronts us with a number of challenging issues that must be addressed. We hope that developments this year, including the report of the Defense Science Board Task Force on the Small ICBM, will provide us with needed insights regarding the best approach to continuing modernization of our land-based ICBMs.

These efforts to modernize U.S. strategic forces should go a long way toward restoring the balance between U.S. and Soviet offensive forces. At the same time, however, the USSR is pursuing a vigorous program of modernization that threatens to outstrip us if we do not continue to execute our current plans and fully deploy the systems now in development.

Conventional Force Modernization

As NATO and the Warsaw Pact move closer to nuclear parity, we can no longer rely as heavily on our nuclear arsenals as the mainstay of our deterrent posture. It becomes critically important to build and modernize our conventional forces to complement our strategic forces. Our conventional forces must be sufficiently robust so that the chances of nuclear escalation are reduced.

Several recent developments suggest that conventional deterrence will become increasingly important to us and our allies. In the strategic defense arena, the President's SDI research program has the potential to contribute to protection against a first strike and, combined with limits on offensive weapons, to a common defensive posture for both the U.S. and the USSR. If we move toward an era where defensive systems dominate over offensive ones, we will be required to rethink our whole approach to deterrence. Our defense policy will have to evolve to reflect such changes. In this context, an increasingly important objective for research and engineering will be to exploit technology that can increase our capability to maintain a credible conventional deterrent.

We are currently exploiting emerging technological capabilities to detect, track, target, and strike the enemy deep in his own territory. Elements of the SDI program such as battle management, target information transfer, and kinetic energy weapons research will yield results useful for improving our conventional capabilities as well.

Across a broad front, we are aggressively pursuing the technologies associated with reducing the natural signature (electronic and acoustic) of platforms. The design of systems to achieve this involves the blending of numerous factors including performance, cost, and survivability. Signature control technology offers a means of making large portions of the threat obsolete by drastically limiting the ability of enemy sensors to acquire, track, and provide the information required for engagement of U.S. weapon platforms when they are countering enemy attacks. In the future, it will be increasingly important for us and our allies to use these and other developments to achieve the force multiplier effects necessary to strengthen conventional deterrence.

An important element of our conventional force modernization program is our "Conventional Initiatives" package of developmental programs that will allow us to both see and strike the enemy throughout the depth of the battlefield. This set of programs include advanced long-range sensor systems such as Joint Surveillance and Target Attack Radar System (JSTARS), Precision Location Strike System (PLSS), and Advanced Synthetic Aperture Radar System (ASARS) that will provide real-time intelligence information to the Theater Commanders to prevent surprise and, in the event of an enemy attack, provide targeting information on enemy forces so that they can be engaged long before they reach the front.

The long-range strike part of the Conventional Initiatives package includes both surface-launched and air-launched missile systems, such as the Air Force/Army Joint Tactical Cruise Missile System (JTACMS) and the Army's Tactical Missile System (ATACMS), that can be used to both destroy enemy forces behind his lines and mass fire laterally along the front. A relatively small number of such long-range systems is capable of massing large amounts of firepower at any point of enemy attack along the NATO front. These developments will make a large contribution to the Reagan Administration's priority of strengthening NATO's defenses.

In addition, we are continuing our conventional force modernization program which encompasses a wide range of projects designed to greatly improve the warfighting capabilities of our land, air, and naval forces.

For land warfare, modernization continues at a high rate emphasizing the introduction of new armor, mechanized infantry, anti-tank, fire support, and air defense systems. The Abrams M1A1 tank, with its 120mm gun, will go into full rate production this year. Production continues on the Bradley fighting vehicle with live-fire tests planned this year that will provide the basis for vehicle survivability improvements. Lethality upgrades are underway for the TOW and Dragon anti-tank missiles and our tank guns--necessitated by advances in threat armor. In fire support, production continues on the Multiple Launch Rocket System (MLRS)--a system that will give the Army a new dimension in indirect firepower with many guided and unguided munition alternatives. The Apache attack helicopter will enter operational units this year; it will provide the Army with a substantial improvement in anti-armor capability in both day and night. In air defense, Patriot is being deployed in Europe and the Army is undertaking a comprehensive program to upgrade forward area air defense in the wake of the Sergeant York cancellation. In new technology developments, the hypervelocity missile and the Fiber Optic Guided Missile (FOG-M) offer exciting new concepts for greatly increasing effectiveness against many target classes.

For air warfare, we have acquisition programs underway to improve our capabilities to perform counter-air, air defense suppression, and air-to-ground strike missions. For counter-air, we have underway a series of product improvement programs that include engine, sensor, and avionics upgrades for the F-14, F-15, and F-16; and continued production of improved versions of Sidewinder, Sparrow, and Phoenix air-to-air missiles. The F/A-18 has demonstrated high levels of maintainability and readiness that will provide a model for other programs. During the last five years, operational readiness of our tactical aircraft has substantially increased the capability of our forces. For the longer term, we are continuing development of the Advanced Medium Range Air-to-Air Missile (AMRAAM) for both Air Force and Navy fighters. AMRAAM will greatly improve the capability for all our fighters in beyond-visual range engagements. Also, we are in the early stages of developing the Advanced Tactical Fighter (ATF) which will provide a leap-ahead capability in air-to-air combat and help retain our lead over the Soviets in air superiority.

For air defense suppression, we are acquiring the PLSS to locate air defense emitters for targeting by other systems, upgrading the Air Force EF-111 and Navy EA-6B to enhance radar jamming capabilities, and upgrading the F-4G Wild Weasel so that it can fully exploit the capabilities of the High Speed Anti-Radiation Missile (HARM).

For air-to-ground missions, we are developing the F-15E for long range interdiction missions with deliveries planned next year. We are fielding the Imaging Infrared (IIR) version of Maverick which will be highly effective against tanks and other targets day or night. To help our tactical aircraft deliver these weapons more effectively and from greater standoff ranges, we are developing advanced sensors such as the Low Altitude Targeting and Navigation Infrared System for Night (LANTIRN). In the GBU-15/AGM-130 program, a family of modular guided weapons is being developed to destroy high value targets from standoff distances using TV or IIR guidance. Other examples of new standoff capable weapons being deployed include the Navy's extended range Walleye I and the laser guided Skipper. The Air Force and Army's JTACMS, in advanced development, will provide the versatility to accomplish many strike missions with different warheads matched to the target. These new strike systems are designed to increase launch platform survivability and enable more effective operations in a high threat environment.

For naval warfare, we have important ongoing acquisition programs designed to expand and improve the defense of our carrier battle groups. In Anti-Air Warfare (AAW), the Aegis cruiser and DDG-51 guided missile destroyer programs will provide substantial improvements in protection against airborne threats. To improve our capability in Anti-Submarine Warfare (ASW), the LAMPS and carrier based ASW helicopters, and programs to provide improved ASW missiles and torpedoes are continuing. Our attack submarine force provides a vital element in our maritime strategy. The stealth and detection characteristics of our attack submarines provide us with a high-leverage capability to counter enemy submarines and surface ships as well. The new SSN-21 program, undergoing contract design this year, is critical to maintaining our advantage in attack submarine capability.

In addition, we have initiatives underway aimed at (a) improving wide area maritime surveillance, (b) outlining a broad strategy for regional air defense, and (c) identifying advanced programs and technologies necessary to counter the improving Soviet submarine threat.

Chemical Deterrence

For the first time in over 16 years, the United States will be able to upgrade its chemical arsenal to provide essential deterrence. Congressional approval to proceed with chemical modernization via binary weapons production is a vital facet of conventional deterrence which also contributes significantly to raising the threshold of nuclear war. We will continue to develop binary chemical weapons that complement our tactical goals and are capable of putting the enemy at risk across the full range of the modern battlefield. The binary production decision now allows us to get rid of the old chemical stockpile.

Science and Technology

The main purpose of the Science and Technology (S&T) program is to maintain a technological lead over potential adversaries To this end, the DoD conducts, through the Services and Defense Agencies, basic and applied research and advanced technological developments. Among priority efforts are the Strategic Computing program, the Very High Speed Integrated Circuits program, the Aircraft Propulsion Technology program, and the Advanced Aircraft Technology program. In strategic computing, artificial intelligence capabilities are being developed for a variety of applications. The aircraft programs strive for major increases in capability in propulsion, overall operational improvements, and survivability. In addition, we are also continuing work on joint programs with NASA for exploration of the technologies associated with hypersonic, transatmospheric flight.

A major cooperative effort with universities--The DoD-University Research Initiative--to speed the development of technology for future military options will be continued.

International Cooperation

The Emerging Technologies initiative has focused on efforts to field advanced conventional capabilities which will make a substantial difference in the ability of NATO forces to repel Warsaw Pact aggression. The NATO Ministers have recently agreed to jointly undertake a more broad-based and far reaching effort to improve conventional deterrence. This further underscores our joint commitment to the kind of cooperation that must take place in an era of constrained resources to address an undiminished Soviet threat.

Implementation of cooperative agreements will be facilitated by the active role the U.S. Congress has taken in support of NATO armaments cooperation. This support includes enactment of the authorization legislation commonly referred to as the Nunn and Quayle amendments. The authority contained in these initiatives provides us in the Department of Defense with a concrete framework in which to carry through our important objective of conventional force improvements through armaments cooperation.

In addition to NATO, we pursue cooperation, on a bilateral basis, with Japan and other friendly nations. With Japan our goal is to realize a technological partnership wherein a two-way flow of technology will result. The Services have designated a Senior National Representative to organize and manage a coherent program of technological cooperation with Japan.

MANAGEMENT INITIATIVES

In order to help to accomplish the important tasks before us, we have also undertaken a number of management intiatives.

USDRE Management

Within OUSDRE over the last several months, an intense recruiting effort has culminated in the selection of five new deputy undersecretaries. We have also named a new Director of the Defense Advanced Research Projects Agency (DARPA) and a new Assistant to the Secretary of Defense for Atomic Energy will soon be in place. All these individuals come to their positions of government service with exceptional professional credentials. All have made substantial personal and financial sacrifices to serve the Department of Defense. Under their leadership, the resources made available for research, development, test and evaluation will be ably managed.

Emphasis on the Defense Acquisition Improvement Program

Over the years in defense acquisition, there has been a tendency to try to solve the very complex problems inherent in acquiring complex systems with somewhat simplistic solutions. In recognition of the need for a more finely-tuned approach, this Administration launched the Defense Acquisition Improvement Program (DAIP). Within OUSDRE, several of these initiatives are of important management concern. These include Program Stability, Competition, and Industrial Responsiveness.

In order to promote greater affordability and stability for our overall defense program, all new starts are carefully reviewed to ensure that only those of highest defense priority are allowed to compete for funding.

We also pursue initiatives to enhance program stability during development through "program baselining." Each of the Services has implemented a management review program which establishes a system cost, schedule, and configuration baseline. Proposed major changes to the approved baseline must be reviewed and evaluated for need and cost efficiency. As a result, we expect to discourage costly arbitrary program changes.

Competition is a means of achieving more for the defense dollar. Competitively awarded contract dollars increased $14 billion in FY 1985. We also awarded 71.6% of contract actions competitively in FY 1985 versus 68.1% in FY 1984 and 52.6% in FY 1983.

Perhaps more importantly, however, from the perspective of an USDRE, is the need to emphasize competition as a way to generate technology options to meet our mission requirements. By obtaining competitive technological approaches at the front end of the acquisition process we can ensure that our investments in R&D are highly leveraged. In summary, we will promote competition where it makes sense both to achieve cost savings and to accomplish other desirable objectives.

We are actively encouraging our R&D program managers and our R&D contractors to consider industrial base issues during all phases of R&D. We need to maintain a healthy, viable industrial base as an important element of our deterrent.

Joint Program Management

Making joint programs succeed takes a concerted effort by Congress, the Office of the Secretary of Defense (OSD), the Office of the Joint Chiefs of Staff (OJCS), and the Services. DoD uses special high level management bodies to address the opportunities and challenges of joint program development and management. DoD also continues to initiate R&D actions which enhance affordability in addition to meeting interoperability requirements and improving logistical efficiency. Our search for opportunities includes: surveying multi-Service mission requirements for common functions or related threats; resolving unnecessary differences in requirements and specifications; integrating requirements to get more economical production rates and more competitive acquisition; and developing common, simplified training and logistic support bases.

We support strong Joint Chiefs of Staff utilization of the Joint Requirements and Management Board (JRMB) to identify joint military requirements and candidates for joint research and development, and to resolve Service requirement issues that may arise after joint programs are initiated. The JRMB is off to a good start and will continue to be helpful in solidifying joint programs.

Currently, there are more than 150 joint programs in various stages of development and procurement. In addition, resolution this past year of inter-Service issues regarding JSTARS and the Joint Service Advanced Vertical Lift Aircraft (V-22) provides two examples of the commitment of OSD leadership to effective joint progam management.

Other Initiatives

We are also supporting other efforts such as the Deputy Secretary's Acquisition Streamlining Initiative. This initiative to tailor development and procurement specifications during new system reviews is resulting in the elimination of requirements that are overly ambitious and uneconomical.

II. U.S.-USSR RESEARCH AND DEVELOPMENT BALANCE

INTRODUCTION

This chapter contains an overview assessment of the U.S.-USSR research and development (R&D) balance. Such an assessment is useful because:

- It gives us a broad view of where we have been and where we are going. It places our current defense R&D effort in context and highlights those trends that may require changing emphasis in future R&D programs.
- It alerts us to be on guard in areas where the USSR may be taking advantage of our open society to acquire advanced technology through legal and illegal means.
- It points to mission areas or weapon types where the U.S. or USSR face the prospect of replacing large quantities of aging equipment.
- It points to possible areas of high leverage, where relatively small investments can have major impacts.

The kinds of simple static balance comparisons that can be presented in an open publication have limitations: they omit critical areas of technology that must remain classified; they do not address the interactive dynamics of U.S.-USSR force acquisitions; and they cannot even begin to illuminate the potential outcomes of combat. Nevertheless, we feel such comparisons are useful because they foster public understanding of the issues to be considered in our FY 1987 budget and direct the attention of specialists to the threats and opportunities we appear likely to face in the 1990's.

The discussion in this chapter will focus on several broad areas. More detailed information by military mission area is presented in later chapters. Here are discussed: (1) defense resources--dollars and manpower devoted to defense in general, and defense-related

R&D in particular; (2) the R&D organizations and processes by which the U.S. and USSR turn new technology into deployed weapons; (3) the comparative levels of basic and applied research and development efforts; (4) the level of technology incorporated into deployed weapons; (5) the numbers of new and modified weapons developed and introduced into the forces in the last 25 years; and (6) the degree to which the technological improvements incorporated in those weapons reflect the Warsaw Pact's exploitation of Western advances.

Within the discussion of major mission areas in later chapters, data are presented on the major new weapons deployed in the mid-1980's, the major qualitative trends in modernization in the mid-1980's, and selected statistics on numbers of new weapons, inventory value of forces and aging trends.

DEFENSE EXPENDITURES

In terms of overall spending the USSR is estimated to devote roughly 16% of its Gross National Product (GNP) to defense. This compares to 6% for the U.S. (Figure II-1). Our NATO allies contribute substantially to the common defense. The measurable contribution of the non-Soviet Warsaw Pact countries to the Warsaw Pact is limited. When measured in dollars, NATO defense expenditures exceed those of the Warsaw Pact (Figure II-2).

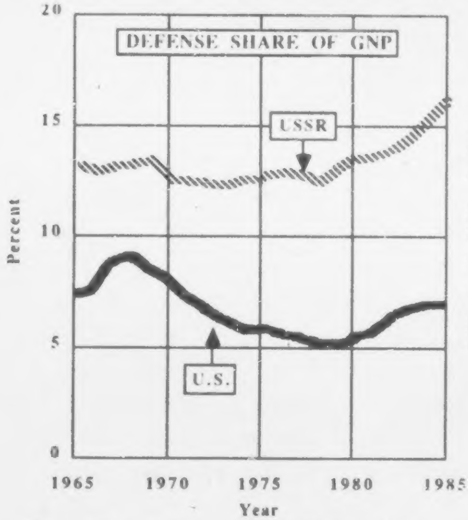


Figure II-1. U.S. and USSR Defense Spending as a Percentage of Gross National Product, 1965-1985

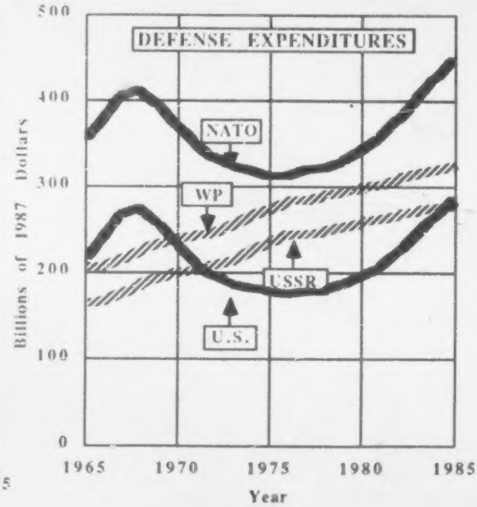


Figure II-2 Estimated Dollar Cost of NATO and Warsaw Pact Defense Activities, 1965-1985

The Soviets' commitment of resources to both military research and development and procurement has been enormous. Over the past 20 years the dollar cost of Soviet military investment (RDT&E, procurement and military construction) has increased at an average annual rate of 3%. Soviet military R&D activities alone have increased at about 4% annually. During the past ten years, growth in Soviet procurement has slowed, but its level has been so high that the estimated dollar cost of Soviet defense investment exceeded U.S. outlays by approximately $350 billion (Figure II-3).

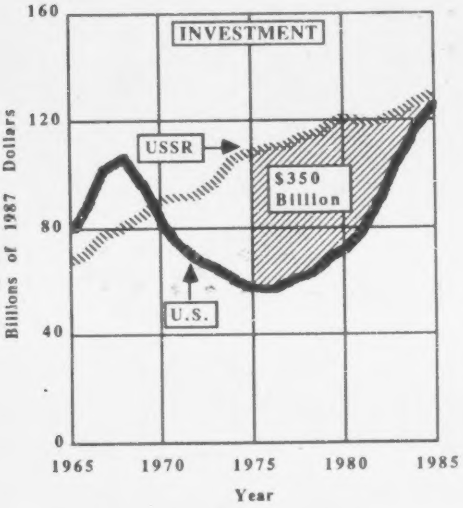


Figure II-3. A Comparison of U.S. Defense Investment Outlays with Estimated Dollar Cost of USSR Defense Investment, 1965-1985

The last decade has seen significant expansion in Soviet investment in those organizations that carry out military-related R&D. Despite such efforts, the recent strengthening of the U.S. military R&D commitment and its prospective continuation into the future represents a continuing response to Soviet military R&D. If they so choose, it will remain difficult for the USSR to close many already existing technology gaps, and new ones are likely to emerge. U.S. R&D expenditures have remained about 12% of Defense outlays since the late 1970's. Estimated Soviet RDT&E expenditures have risen steadily over the last 20 years. The impact of the Soviet R&D program has been to create a wide array of future options for exploiting existing technology across the broad range of military missions.

This Soviet challenge is qualitative and quantitative and requires that we maintain both a sustained modernization effort and a strong defense technology base to assure an acceptable balance of near and long term risks to national security. Our prospects for achieving such a balance are enhanced, in part, by our strong commercial technology base, which has helped alleviate the asymmetry in expenditures for military research and development.

The challenge presented by the growing Soviet military RDT&E program and the Warsaw Pact military industrial base has several dimensions. First, the Soviet military acquisition effort has traditionally been characterized by the highest national priority, centralized control in the execution of its plans, and long range program stability. High production rates and a deliberately evolutionary approach--routinely improving existing systems in parallel with the development of new systems--are also characteristic of the effort. Taken together, those approaches have led to steady, across-the-board improvements in military capability in all mission areas.

At times the independence and national priorities of NATO members mitigtate against an efficient weapons development process, whereas coordination of Warsaw Pact efforts entails coercion rather than the negotiation that occurs within the NATO alliance.

However, the Soviet acquisition program has weaknesses. These stem from three interrelated factors: the Soviet system lacks the flexibility and incentives inherent in free-enterprise economies with their many suppliers; they depend on Western accomplishments to point the way toward high-technology advances; and their domestic political priorities and age-old penchant for secrecy hinder the dissemination and application of scientific developments.

WEAPONS R&D ESTABLISHMENTS

The USSR has recognized that leadership in science and technology plays a key role in maintaining world leadership--industrially, economically, militarily and politically. They have established a centrally controlled system to formulate and carry out their R&D programs and to manage the flow of research through its various phases--fundamental, exploratory and applied. The Politburo sets broad national R&D policies. Occasionally, it even initiates new weapon programs (e.g., atomic bomb and ballistic missile developments). The Soviets' strategy for the achievement of their R&D goals includes a high and steadily increasing level of resource investment, and encompasses essentially two approaches: (1) the maintenance of a large indigenous technology base to support military and industrial development, and (2) the acquisition and assimilation of Western technologies to reduce the time, cost and risk involved in new programs. The Soviet military RDT&E program is characterized by stability in funding, personnel, and program plans. Its steady growth continues.

Soviet military-related R&D is carried out in research institutes, design bureaus, and production associations--the same types of organizations involved in the Soviet weapon system acquisition process. In the USSR these organizations tend to be integrated vertically, which has led to many programs being conducted by highly specialized entities, often working in total (and sometimes self-defeating) isolation from each other (Table II-1).

Most Soviet research projects (military and civilian) are conducted in the research institutes, many of which are under the jurisdiction of the various Academies of Sciences. The overall number of institutes in the USSR has doubled from about 1,500 in 1960 to over 3,000 today. This reflects the steady expansion that has taken place in the Soviet research base and represents a significant capital investment and increase in capability. Over the past several years, the National and Regional Academies and other Soviet civilian research institutes have been assigned an increasing number of defense projects. About half of all R&D conducted in the USSR is now military-related, which compares to the roughly 30% of all U.S. R&D which is currently military-related.

The design bureaus are subordinated to the defense industrial ministries and play a critical role in technical innovation and development of advanced systems. Organizationally located between the research community and the production organizations, the design bureaus are

Table II-1. Major System Acquisition Functions and Primary Performers

Functions	Performers	
	United States	Soviet Union
Research	Government Laboratories Educational Institutions Industrial Contractors	Academies of Science Ministry of Higher and Secondary Specialized Education Research Institutes*
System Development	Industrial Contractors	Design Bureaus*
Production	Industrial Contractors	Series Production Plants*

*Subordinated to Defense Industrial Ministries.

responsible for developing new equipment, employing the best available technology that is consistent with system and production requirements. Their management approach features multi-year program funding, preplanned product improvement and early responsiveness to U.S. and NATO program developments. A small amount of exploratory research is performed by design bureaus.

Conglomerate organizations, called "production associations," integrating independent research institutes, design bureaus and production facilities are becoming the basic unit of Soviet military industry. These associations combine vertically a number of organizations under a single management and they can include some or all of the above types of independent organizations. The principal purpose of the shift to the association form of organization and management is to accelerate the pace of scientific and technological progress and to reduce the lead times required. to bring new technology into production.

Despite major differences in their weapons development processes, full scale development times--from authorization of Experimental Design Work (OKR) in the USSR, or Full Scale Development (FSD) in the U.S., to Initial Operational Capability (IOC)--are close for the two countries. Major military systems in both countries take 8 to 12 years from the beginning of development until development is completed.

Military service-developed requirements keep Soviet system developers--the design bureaus--fully occupied. While the number of U.S. and Soviet system developer organizations is about the same (Table II-2) differences in approach have resulted in the Soviets pursuing a larger number of programs over time. Each Soviet organization has its own specialization(s), and maintains full employment with development proceeding at the stable level of effort the Soviets feel is needed to handle their long term military requirements. U.S. contractors, on the other hand, have a

Table II-2. Number of U.S. and USSR Major Military Systems Developers*

System Type	U.S.	USSR
Strategic Missiles and Space Boosters	5	7
Tactical Missiles	10	9
Aircraft	12	9
Ships	9	6
Satellites	8	6
Tracked Vehicles and Artillery	8	7
Radars	7	8
Total	59	52

* Some involved in more than one system type.

more cyclical business. Available funding and employment fluctuate, dropping substantially when firms do not win new contracts. U.S. defense contractors draw from essentially the same pool of workers, who can, and do, move around among organizations. Steady full employment and uniform growth rates have allowed the Soviets to conduct up to three major development programs simultaneously in each major design bureau's product base. More than 200 major military development programs and a significant number of lesser modified programs are completed by the 50 major Soviet design bureaus, every ten years. In support of these developments, the Soviets have some 4500 research projects in process.

The Soviet Union has for years steadily increased its manpower allocated to R&D. It maintains a numerical superiority over the U.S. in full-time equivalent scientists and engineers engaged in R&D. This quantitative superiority, however, does not necessarily give the USSR the capability to out perform the U.S. in R&D. In many cases, Soviet capital investment has not kept pace with this growth in manpower, advanced equipment has not been provided, automated support systems are not available and as a result productivity may be lower. Moreover, the nature of Soviet society tends to stifle innovative and imaginative thinking--key elements in the successful pursuit of research. As a result, the Soviets use more manpower than does the U.S. to perform similar R&D activities.

WEAPONS R&D PROCESSES

The U.S. and the USSR have stylized, formal weapons research and development processes that while structurally very different, are functionally rather similar. Both countries support a continuing military research program to identify, explore and develop the basic technologies necessary for the development of new weapons and the improvement of existing weapons. Both have formal requirements processes that specify needs for new weapons and support systems, based largely on threat and opportunity assessments. Both require formal documentation for each major phase of weapons development, including high level approval to invest resources before proceeding from initiation of a weapons program through to production and deployment. Both have well defined test and evaluation procedures which are implemented throughout development. As indicated earlier both take about the same time from approval of a major weapons development program through full scale development.

Despite these similarities in form and development times, there are many important differences between the weapons development environment and processes of the two countries. These differences involve: the methods of weapons oversight, review and approval; the industrial bases of the two countries and the environments in which the defense industries of the two countries operate; the research and system design management styles; and the relative emphasis on new technology. The differences between the Soviet and U.S. acquisition processes can be summarized by:

- National Management and Budgeting

- The Soviets have an established top level national weapons oversight organization, the Military Industrial Commission (VPK), that combines oversight and supervisory functions performed in the U.S. by the Department of Defense and the Congress, as well as some functions of the private industrial sector. Each major program phase decision is staffed through the VPK which reports to the Council of Ministers, and is documented in a decree which has the authority of law.

- The major development decision made to approve the resources required to proceed with Full Scale Development is the Defense Systems Acquisition Review Council Milestone II (DSARC II) in the U.S., and in the Soviet Union it is the Joint Decree of the Central Comittee of the Communist Party and the Council of Ministers. This is the first, and possibly only, major approval in the Soviet Union whereas it is the second of three major approvals in the U.S.

- U.S. resource commitments for defense programs are revisited on a yearly basis because of Congressional approval requirements, while Soviet resources are committed for the full program once directed by the issuance of a Joint Decree.

- A major segment of Soviet industry is dedicated to defense work, maintains full employment, and has top national priority on national resources; whereas U.S. defense contractors must compete for business in market conditions that have wide variations.

- The top level people involved in major weapon acquisition decision making remain in their positions much longer in the USSR than in the U.S.

- As a result, Soviet major military development programs tend to be much more stable and have greater continuity than U.S. development programs.

- System Design Management and Style

- Higher Soviet program security makes it more difficult for both other Soviet organizations and the U.S. to take advantage of Soviet knowledge and developments.

- The USSR has separate research, design and production organizations; in the U.S. the functions are generally integral to single contractors.

- The top priority of Soviet programs is to meet preset program schedules; while the top priority of U.S. programs is technical performance in order to win contracts.

- The U.S. tends to use new technology for each new system to provide maximum technical performance; the Soviets emphasize extensive use of technology transferred or acquired from the West to keep pace with the technology in threat systems, and use off-the-shelf components for producibility considerations to help meet the program requirements and schedule.

- Technology freeze occurs in USSR programs at the beginning of the Experimental Design Work (OKR) Development Phase (equivalent to Full Scale Development in the U.S.); while it occurs years later in the middle of Full Scale Development in U.S. programs.

The USSR emphasizes product improvements proceeding in parallel with new developments. This reduces the need for the Soviets to push technology in each development program since if the next program doesn't achieve desired performance, the one starting a few years later will come closer. In addition, the phasing of product improvements and new system developments allow full employment to be maintained and effectively used at the major design bureaus.

These similarities and differences between the U.S. and Soviet weapons R&D systems are discussed not because we should emulate the Soviet system, but rather because of what we can learn by observing their system more closely--how they are likely to respond to our initiatives, how to protect U.S. and allied technology, and how to improve our procedures and processes. On the last point--without sacrificing the edge we achieve by demanding intense competition--the U.S. clearly could benefit from a unified, long-term commitment from all of the decision makers involved in weapons procurement to maintain continuity and stability in major programs. Improved effectiveness and efficiency would be the result.

TECHNOLOGY AND WEAPONS DEVELOPMENT

Basic Research and Advanced Technology

We are now fielding systems using technologies that were developed during the late 1960's and early 1970's. We must now lay the technology foundation for those weapon systems that will be needed in the 1990's and the next century.

The products of the large Soviet R&D effort are of concern. Our S&T program, in addition to providing us weapons options, keeps us from being surprised by technological innovations and enables us to react relatively quickly to new Soviet weapons developments. Basic technologies that have potential for significantly impacting military capabilities in the next 10 to 20 years are compared in Table II-3. The U.S. is shown to have maintained its lead in most of the basic technologies critical to defense, although potential exists for the Soviets to gain ground in many areas where we now lead. It is essential that we maintain that lead in order to offset somewhat the great disparity in the quantity of equipment they have deployed.

Military technology is not useful unless it is incorporated into deployed military systems. The relative technology levels in deployed weapon systems are shown in Table II-4. These assessments deal solely with technology level and do not measure overall force effectiveness or the quantity of equipment deployed. Such effectiveness is dependent on other factors like doctrine, tactics, training and numbers deployed. The table shows, in aggregate, roughly the same level of deployed technology in land forces with the U.S. superior in the strategic, air, naval, and C^{3}I areas. However, the number of weapon types tending toward equality or Soviet superiority represent a matter of concern--it has not always been that great--and we may be losing our lead as a result of higher Soviet R&D effort and their emphasis on acquisition of Western Technology.

Introduction of Weapons

The large Soviet R&D program has borne fruit. One simple measure of the effectiveness of the U.S. and Soviet programs is the number of newly developed weapons, and major modifications or improvements introduced into the respective military forces. Over the last 25 years the USSR has consistently introduced more new

Table II-3. Relative U.S./USSR Standing in the Twenty Most Important Basic Technology Areas*

Basic Technologies	U.S. Superior	U.S./USSR Equal	USSR Superior
1. Aerodynamics/Fluid Dynamics		X	
2. Computers and Software	← X		
3. Conventional Warheads (including all Chemical Explosives)		X	
4. Directed Energy (Laser)		X	
5. Electro-Optical Sensor (Including Infrared)	X		
6. Guidance and Navigation	X		
7. Life Sciences (Human Factors/Biotechnology)	X		
8. Materials (Lightweight, High Strength, High Temperature)	X →		
9. Micro-Electronic Materials and Integrated Circuit Manufacturing	X		
10. Nuclear Warheads		X	
11. Optics		X	
12. Power Sources (Mobile) (Includes Energy Storage)		X	
13. Production/Manufacturing (Includes Automated Control)	X		
14. Propulsion (Aerospace and Ground Vehicles)	X →		
15. Radar Sensor	X →		
16. Robotics and Machine Intelligence	X		
17. Signal Processing	X		
18. Signature Reduction	X		
19. Submarine Detection	X →		
20. Telecommunications (Includes Fiber Optics)	X		

* 1. The list is limited to 20 technologies, which were selected with the objective of providing a valid base for comparing overall U.S. and USSR basic technology. The list is in alphabetical order. These technologies are "on the shelf" and available for application. (The technologies are not intended to compare technology levels in currently deployed military systems.)

2. The technologies selected have the potential for significantly changing the military capability in the next 10 to 20 years. The technologies are not static; they are improving or have the potential for significant improvements; new technologies may appear on future lists.

3. The arrows denote that the relative technology level is changing significantly in the direction indicated.

4. Relative comparisons of technology levels shown depict overall average standing only; countries may be superior, equal or inferior in subcategories of a given technology.

5. These average assessments can incorporate a significant variance when the individual components of a technology are considered.

Table II-4. Relative U.S./USSR Technology Level in Deployed Military Systems*

System Type	U.S. Superior	U.S./USSR Equal	USSR Superior
Strategic Warfare			
Intercontinental Ballistic Missiles		X	
Ballistic Missile Submarines	X		
Submarine Launched Ballistic Missiles	X →		
Bombers	X		
Surface-To-Air Missiles (SAMs)		No U.S. System Deployed	
Ballistic Missiles Defense		No U.S. System Deployed	
Anti-Satellite			← X
Cruise Missiles	X →		
Tactical Warfare			
Land Warfare			
SAMs (including Naval)		X	
Tanks		X	
Artillery			X
Infantry Combat Vehicles		X	
Anti-Tank Guided Missiles		X	
Attack Helicopters	X		
Chemical Warfare			X
Tactical Ballistic Missiles		X	
Air Warfare			
Fighter/Attack and Interceptor Aircraft	X →		
Air-To-Air Missiles	X		
Air-To-Surface Munitions	X →		
Airlift Aircraft	X		
Naval Warfare			
Attack Submarines	X →		
Torpedoes	X →		
Sea Based Aircraft	X		
Surface Combatants	X →		
Naval Cruise Missile		X	
Mines			X
Other			
Command, Control, Communications and Intelligence			
Communications		X	
Electronic Countermeasures/ECCM		X	
Early Warning	X		
Surveillance & Reconnaisance	X		
Training Simulators	X		

*1. These are comparisons of system technology level only, and are not necessarily a measure of effectiveness. The comparisons are not dependent on scenario, tactics, quantity, training or other operational factors. Systems farther than 1 year from IOC are not considered.

2. The arrows denote that the relative technology level is changing significantly in the direction indicated.

3. Relative comparisons of technology levels shown depict overall average standing only; countries may be superior, equal or inferior in subcategories of a given technology in a deployed military system.

systems per year than does the U.S. (Figure II-4). They have also introduced more modifications than the U.S. In the past five years, the U.S. introduced around 4 new systems per year while the USSR; introduced about 10. Figure II-5 indicates new system introductions as a percentage of the total introduced.

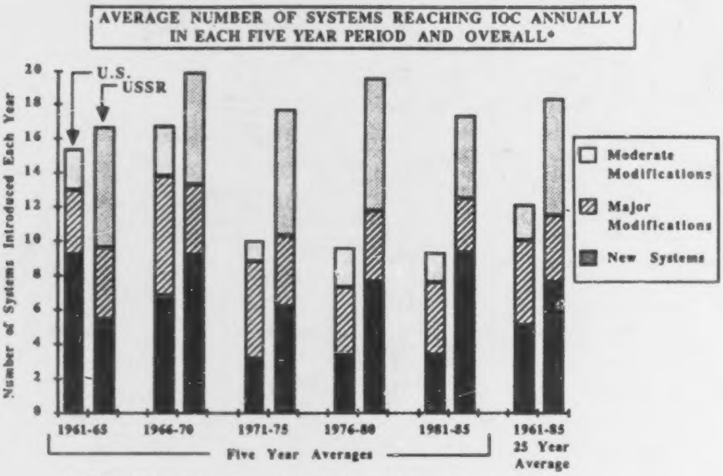
The reasons for these differences are not entirely clear, but they probably include the following: the U.S. has tended to develop more multi-purpose systems, thus requiring fewer different systems; the U.S. has tended to make larger technological leaps from one technological generation to the next; and finally, even within a generation of weapons, the USSR has tended toward multiple approaches to meeting military requirements.

Production of Weapons

Another measure of acquisition capability and ability to sustain that capability over the long run is the weapons production level. Figures II-6 and II-7 show production of weapons delivered by the U.S. and by the USSR, and by the NATO and Warsaw Pact alliances in total. Production FOR is that production designated for a country's or alliances own forces while production BY is the total output of a particular ~~country~~ or alliance (includes exports). Of the 14 weapon types shown, the USSR outproduced the U.S. by substantial ratios in most categories. The NATO-Warsaw Pact figures are somewhat closer. This again illustrates the major contribution non-U.S. partners in NATO make to the common defense as compared to the contribution of non-Soviet countries to the Warsaw Pact. Overall, Warsaw Pact industry out produced NATO industry in 11 categories, with 2 categories about even. These relative statistics, which have been about the same for the past 15 years, underscore the importance of our maintaining technological superiority to offset the larger production and the larger number of deployed weapons in the Pact forces. At the same time it reminds us that our forces face problems in those situations in which technology and quality do not offset numbers.

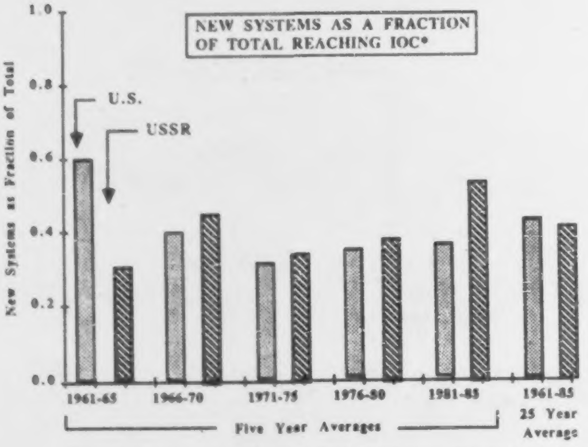
Export Control

For nearly two decades, the Soviet Union has maintained a national-level program for acquiring critical military-related Western technology. This effort is large. It is well organized and it is effective. Fearful of the technological superiority of the West, Soviet military decision-makers have mandated the acquisition of such technology through a variety of mechanisms. The Soviets use intelligence organizations;



*Excludes Space and Radars & Other Stand-alone Electronic Systems

Figure II-4. Average Number of U.S. and USSR New and Modified Weapons Systems Reaching IOC Annually, 1961-1985



*Excludes Space and Radars & Other Stand-alone Electronic Systems

Figure II-5. U.S. and USSR New Weapon Systems as a Fraction of Total New and Modified Systems Introduced, 1961-1985

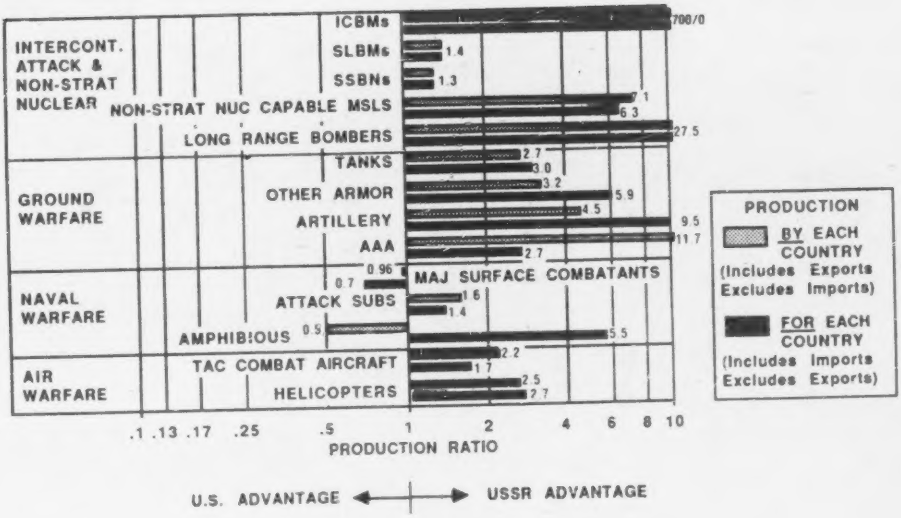


Figure II-6. Production Ratios of Selected Weapons: U.S. and USSR, 1981-1985

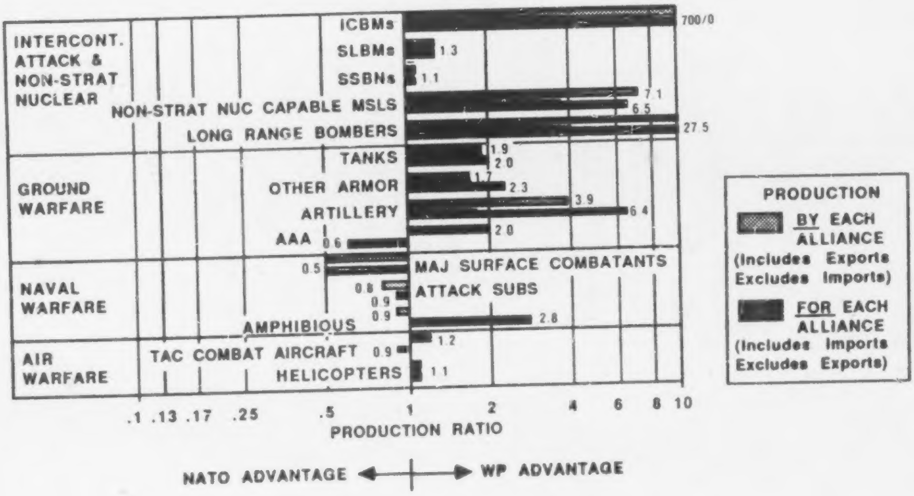


Figure II-7. Production Ratios of Selected Weapons: NATO and Warsaw Pact, 1981-1985

KGB (Committee for State Security) and GRU (Chief Intelligence Directorate of the General Staff); the facilities of the Ministry of Foreign Trade in Western countries, including state owned business corporations; the State Committee on Science and Technology, which arranges government science and technology agreements; and the Academies of Science and their Institutes, which have contacts with Western universities and research institutes both directly and through technical conferences. These Soviet organizations also have the cooperation of their counterparts in other Soviet Bloc countries.

We have long argued the significant negative effects on the military balance of successful acquisition of Western goods and technology by the Warsaw Pact. This contribution to Warsaw Pact military efforts has:

- Saved billions of rubles;
- Reduced weapon systems procurement times;
- Enhanced the productivity of the defense industrial base;
- Reduced engineering risks in weapons development; and
- Enabled more effective responses to Western weapons and tactics.

The operational military impact of these technology acquisition efforts is particularly disturbing. Table II-5 enumerates a number of Soviet/Warsaw Pact acquisitions over the last 30 years that have provided important contributions to Soviet capabilities in key mission areas.

We see several important ways in which acquired technology has impacted on Soviet military capability:

- There is evidence that such technology has directly contributed to Soviet weapons systems (e.g., through reverse engineering or through direct use of products or expertise employed in weapon development programs). The contribution of Western microelectronics is a clear example of this type of effect.
- Similarly, we have seen significant improvements in Soviet industrial productivity which have occurred through the use of acquired products and technology (e.g., robotics).

Table II-5. Examples of Western Technological Contributions to Soviet Military Capability

Western Technology Acquired	Soviet Application/Improvement
Strategic Missiles	
Documents on Cruise Missiles Using Radar Terrain Maps	Cruise Missile Guidance
Documents on Heat Shielding Material for Reentry Vehicles	Ballistic Missile Warheads
Documents on Ballistic Missile Defense Concepts	Future Ballistic Missile Defense
Ground Warfare	
International Radar Conference Documents	Synthetic Aperture Radar for Aircraft Detection
Ground Support Equipments for U.S. TOW Antitank Guided Missile	Countermeasure System
U.S. Copperhead Laser-Guided Artillery Documents	New Laser-Guided Artillery Shell
Laser-Guided Missile Documents	Portable Antiaircraft System
Infrared Imaging Subsystem Designs	Fire-Control System of Future Tank
Millimeter Radar Documents	Antitank Missile
Pressure Measuring Instruments and Documents	Advanced Modeling for New Artillery Projectiles
Naval Warfare	
Aircraft Carrier Steam Catapult Design Documents	Aircraft Launching System for New Aircraft Carrier
U.S. MK 48 Torpedo Documents	Antisubmarine Torpedo
Gamma Radiation Radiometer	Nuclear Submarine Wake-Detection Trailing System
Acoustic Spectrum Analyzer	Submarine Quieting
Powerful Acoustical Vibrator	Submarine and Ship Sonars
Air Warfare	
F-14, F-15, F-18 Documents on Fire-Control Radars	Four Soviet Fighter Aircraft
U.S. Phoenix Missile Documents	Semiactive Air-to-Air Missile
Infrared Radiometer	Reduced Infrared Signature Aircraft
Fiber-Optics System	Aircraft and Missile Onboard Communication Systems
Air-to-Air Missile Documents	New Air-to-Air Missile
Space and Antisatellite Weapons	
Documents on Systems and Heat Shield of the U.S. Space Shuttle	Reusable Space System
Transit Naval Navigation Hardware	First-Generation Space-Based Naval Radio Navigation System
U.S. Navstar Navigation System Document	Digital Signal Processing for Counterpart Satellite System
High-Energy Chemical Laser Documents	Space-Based Laser Weapon
System 101 Processing Equipment	Digital Processing and Video for Space Based Reconnaissance; Missile, Bomb and Remotely Piloted Vehicle Command Guidance
Manufacturing and Technology	
Kevlar 49 Fiber Documents for Missiles	Improved Missile Development
Complete Set of Manufacturing Equipment for Printed Circuit Boards	Copied for 11 Production Assembly Lines for Strategic Missile, Armor and Electro-Optics, and Radar Industries
DTS-70 Printed Circuit Board Testing System	Military Microelectronic Production System
Fiberglass Manufacturing Technology	High-Pressure Air Tanks for Submarines
Computer Disk Memory System	Military Ryad Series Disk Drives
Bubble Memory Technology	Tactical Missile Onboard Memories
Technical Documents on Tests of Cold-Rolled Steel	Improved Structural Protection of Warships
High-Accuracy Three-Dimension Coordinate Measuring Machine	Copied for Several Industries

- Finally, our studies show significant savings in Soviet defense resources which have occurred through the exploitation of Western technology which we believe has been applied to other aspects of Soviet defense. Our estimates of such savings to their defense budget approach tens of billions of rubles. These savings have very high military leverage, particularly in their quest for qualitative weapons improvements.

As the Soviets pursue their aggressive technology acquisition program, the U.S. and its allies must continue to work diligently to curtail those transfers that could have significant adverse military impact. Our recent export control efforts have been successful in curtailing some critical transfers; indeed our studies have shown that, since the early 1980's, the U.S. Technology Security Program has denied the Soviets information and material they would have otherwise obtained. There will be continued efforts on the part of the Soviets to acquire specific technologies in the coming years. Given this fact, we must continue to place emphasis on restricting transfers, not only through the use of the domestic Commodity Control List (CCL) and the International Coordinating Committee (COCOM), but also through other channels. Bilateral arrangements are in process or have been worked out with certain non-COCOM countries regarding protection of U.S. militarily critical technologies and products. Success in these efforts may well be one of the more urgent defense issues for the coming years.

CONCLUSION

We have presented our view of the U.S.-USSR R&D and to a lesser extent the NATO-Warsaw Pact balance. The USSR has been investing heavily and is indeed deriving benefits from U.S. and allied programs. It has been introducing new weapons and modifications at a much faster pace than the U.S. Its centralized system allows it to pursue goals with a singular focus that we have been able to generate only in limited instances. At the same time, our free enterprise system gives us a flexibility that has allowed us to keep ahead in technology.

III. STRATEGIC AND NON-STRATEGIC NUCLEAR PROGRAMS

INTRODUCTION

The forces discussed in this chapter include the strategic triad, non-strategic nuclear forces, and strategic defensive systems.

Our basic strategy is deterrence across the entire spectrum of conflict. The balance of American military deterrent power is our strategic nuclear arsenal: intercontinental bombers and associated tankers; land based Intercontinental Ballistic Missiles (ICBMs); and Submarine-Launched Ballistic Missiles (SLBMs) and the Nuclear Submarines (SSBNs) that launch them.

Deterrence is a function of three factors: military capabilities, the will to use them, and a potential aggressor's perception of the first two. Thus, implicit in our concept of deterrence is the capability and determination, should deterrence fail, to deny the enemy, particularly the Soviets, their objectives at any level of conflict.

Throughout the 1960's we possessed a strong deterrent. Our nuclear posture confronted the Soviet leadership with a retaliatory capability sufficient to deny any aggressive ambition it may have harbored. During the 1970's, the U.S. attempted to promote and maintain nuclear stability through negotiation and unilateral restraint with regard to our own strategic forces. Unfortunately, by the 1980's it became apparent that Soviet efforts were not aimed at achieving nuclear stability, but at denying us a retaliatory capability.

This evolution is dramatically illustrated in Figure III-1 and Table III-1, which depict the major offensive improvements made by the Soviets and the U.S. since the 1960's and 1970's. The USSR has introduced 10 new weapons and 17 weapon modifications over the last 10 years, compared to 4 new weapons and only 5 modifications for the U.S. The USSR has been most active in upgrading its ICBM force, the most destabilizing of the offensive forces introducing at least seven modifications during the period. More importantly, over the past ten years, Soviet production of strategic weapons far

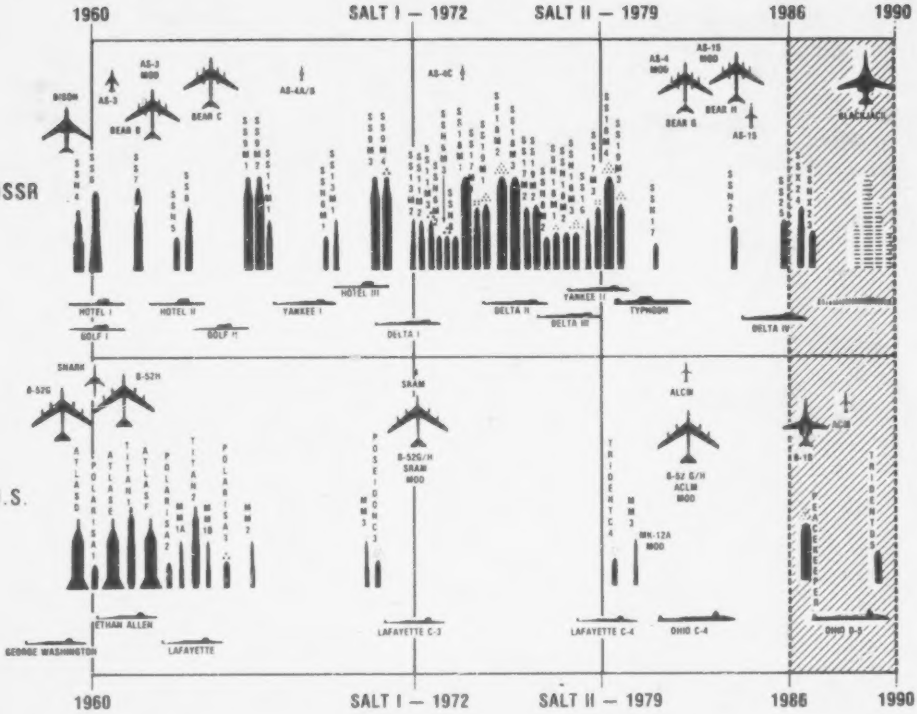


Figure III-1. New and Improved U.S. and USSR Intercontinental Attack Systems by IOC Date, 1960-1990

exceeds that of the U.S. in both types and numbers (Table III-2).

Another measure of comparison is the estimated inventory value (defined in this case as the original procurement cost of the force measured in 1987 dollars) of the three strategic force components of the U.S. and USSR (Figures III-2 and III-3). During the past 20 years, the USSR has by this measure substantially increased its emphasis on strategic submarine forces, while the U.S. has maintained a relatively constant balance among force components over the period.

By the early 1980's, we were confronted by a serious deterioration in U.S. strategic nuclear capabilities. This was due not only to the Soviet offensive force improvements discussed

Table III-1. Number of U.S. and USSR Strategic Warfare and Non-Strategic Nuclear Weapons Reaching IOC, 1976-1985

Weapon Type	New		Major Modifications		Moderate Modifications		Total 1976-1985	
	U.S.	USSR	U.S.	USSR	U.S	USSR	U.S.	USSR
ICBM	0	2	1	2	0	5	1	9
SLBMs	1	3	0	0	0	3	1	6
Intercontinental Attack Bombers	0	0	0	2	1	0	1	2
SSBs and SSBNs	1	1	1	4	0	0	2	5
Strategic ASMs	1	1	0	0	0	0	1	1
Non-Strategic Nuclear Weapons	1	3	2	0	0	1	3	4
Total	4	10	4	8	1	9	9	27

Table III-2. Production Summary of Intercontinental Attack Weapons for U.S. and USSR, 1976-1985*

Category	1976-1985 10-Year Total		1985		10-Year Trend	
	U.S.	USSR	U.S.	USSR	U.S.	USSR
ICBMs	135	2000	0	100	▼	▼
SLBMs	567	1350	74	100	—	—
SSBNs	6	25	1	2	—	—
Intercontinental Bombers**	2	55	2	20	▲	▲

* Does not include production for R&D.

** Does not include Backfire production

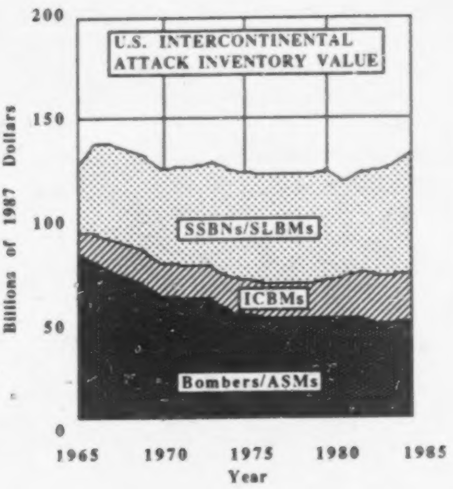


Figure III-2. U.S. Inventory Value of Intercontinental Attack Forces by Triad Component, 1965-1985

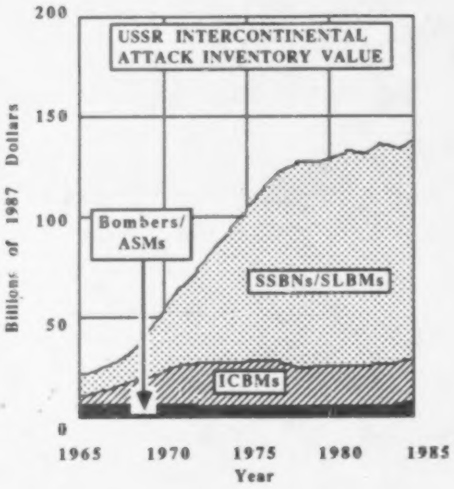


Figure III-3. USSR Inventory Value of Intercontinental Attack Forces by Triad Component, 1965-1985

previously, but also to improvements in their defensive capabilities. Soviet air defenses had become sufficiently sophisticated to jeopardize severely the ability of our B-52s to penetrate. In addition, continuing survivability improvements of their leadership and command and control systems were eroding our capabilities to hold these strategic assets at risk.

Our response has been to take vigorous steps to reverse this imbalance through President Reagan's Strategic Modernization Program. Under this broad initiative, we are working to modernize all three legs of our strategic offensive forces (Table III-3). Our ICBM forces are being upgraded now with the new Peacekeeper missile; and later, the Small ICBM, which is currently in the early phase of development. We will continue to add new Trident submarines to the undersea fleet armed with the C-4 and eventually the D-5 SLBM. The new B-1B bomber is in production, and the Advanced Technology Bomber (ATB) is progressing well in development. Additionally, the B-52 fleet is now equipped with over 1500 ALCMs, and we are deploying other cruise missiles for use on submarines and ships.

These efforts to modernize U.S. forces should go a long way toward restoring the balance between U.S. and

Table III-3. U.S./USSR Strategic Offensive Modernization Programs

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
ICBMs			
Peacekeeper	• Accuracy and throwweight for increased hard target capability and target coverage	SS-X-24 (Peacekeeper class)	• Mobility (and solid propellants) for survivability
Small ICBM	• Mobility and/or superhardening for survivability	SS-25 (Minuteman class)	• Mobility for survivability
PENAIDS	• Decoys and/or MaRVs for high confidence penetrativity	SS-18 Follow Ons	• Accuracy and throwweight for increased hard target capability
Ballistic Missile Submarines and SLBMs			
Ohio class Trident SSBN	• Quieting and performance for high survivability • Sized for increased firepower	Typhoon SSBN	• Quieting and operation under polar icecap for survivability
Trident II (D-5) SLBM	• Accuracy and throwweight for increased target flexibility and target coverage	SS-N-20 SLBM, SS-NX-23 SLBM	• Accuracy and throwweight for increased target coverage
Bombers and Air-to-Surface Missiles			
B-1B (with cruise missile capability)	• Base escape speed and hardness for improved launch survivability • High speed, low altitude and low RCS, plus ECM for improved penetration survivability	Blackjack Bomber (with cruise missile capability)	• Long range and high payload for target coverage and firepower
B-52/Air Launched Cruise Missile	• Force multiplier • High accuracy, long range and low RCS for penetration survivability	Bear H/AS-15 Air Launched Cruise Missile	• Force multiplier and standoff launch with Low RCS missiles for survivability, reuse
Advanced Cruise Missile	• Low observables for enhanced penetration capability		
Short Range Attack Missile (SRAM II)	• Small, high speed for increased carriage and enhanced penetration capability		

Soviet offensive forces. At the same time, however, the USSR is pursuing a vigorous program of modernization that threatens to outstrip us if we do not continue to execute our current plans and fully deploy the systems now in development.

In strategic defense there is a larger disparity between U.S. and Soviet force modernization efforts (Table III-4). The USSR is deploying new ground radars, an upgraded Moscow anti-ballistic missile system, surface-to-air

Table III-4. U.S./USSR Strategic Defensive Modernization Programs

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
Radars			
Ballistic Missile Early Warning System (BMEWS)	• Improved early warning	Krasnoyarsk and Pushkino Very Large Battle Management Radars	• Improved potential for nationwide ABM capability
PAVE PAWS Ballistic Missile Warning System	• Continental coverage for warning of SLBM attack	IL-76 (Mainstay) AWACS	• Improved capability to detect and identify low altitude aircraft and cruise missiles
Over-the-Horizon Radar (OTH-B)	• Long Range, all-altitude surveillance • Flexible capability to address future threats		
Surface-to-Air Systems			
None		Modified Galosh ABM High Acceleration Missile	• Two-layer ABM defense
		SA-10 (SAM) System Modification	• Mobility for increased survivability
		SA-X-12 Gladiator SAM System[*]	• Deployable supplemental ABM capability • Improved low altitude capability
Anti-Satellite Systems			
F-15/Anti-Satellite System	• Responsive to low altitude Soviet satellite • Launch flexibility	Ground-Based Lasers Advanced ASATs	• Complements deployed co-orbital system and Galosh ABM Interceptor • Associated with BMD work
Air-to-Air Systems			
F-15[**]	• Improved air-to-air capability	MiG-31 (Foxhound)[**]	• Improved capability to engage low altitude aircraft and cruise missiles
F-16[**]	• Same as above		
AMRAAM[**]	• Multiple engagements against ECM • Improved speed, agility and warhead	Air-to-Air Missile, AA-9[**]	• Provides look down/shoot down capability

[*] Also included in Ground Warfare modernization comparison in Chapter IV.

[**] Also included in Air Warfare modernization comparison in Chapter IV.

missile systems and air-to-air systems. In addition, the Soviets are developing and deploying airborne warning and control systems which will further challenge the capability of our bombers to penetrate. In contrast, the U.S. has to this point modernized only its warning systems, begun modernization of its small force of dedicated air defense interceptors, and pursued initial development of the U.S. ASAT system. This situation may change, however, with the Strategic Defense Initiative (SDI). The SDI research program offers the possibility of a more stable deterrence based upon defenses that are survivable, militarily effective, and reasonable in cost. If our vigorous research shows that such defenses against ballistic missiles are feasible, then we may transition from a deterrence based largely on the threat of nuclear retaliation to one based upon defensive capabilities that poses no threat to anyone. SDI research programs also provide insurance against the unilateral Soviet deployment of a similar system, as well as a necessary response to the current Soviet offensive and defensive buildup.

In non-strategic nuclear systems, the USSR is also pursuing a vigorous program with the development of theater ballistic and cruise missile systems (Table III-5). The U.S. is countering these systems with the deployment of the Pershing II and Ground Launched Cruise Missile (GLCM), which together provide many of the force characteristics needed to offset Soviet force improvements.

The challenge to us is to complete these programs within the constraint of a strategic forces budget that has been held to less than 15% of the overall DoD budget for the past 20 years (Figure III-4). This is being accomplished by exploiting the technological advantages we have over the Soviets. For example, in the ICBM area, we can put their hard

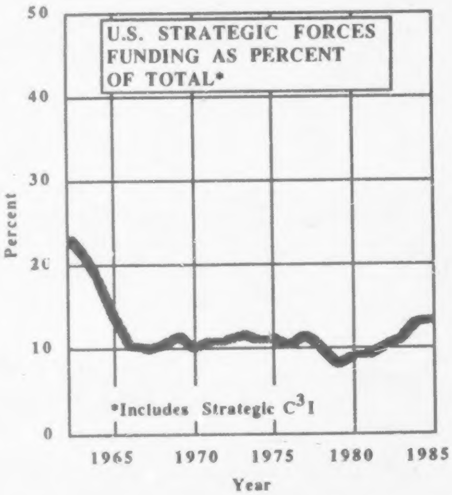


Figure III-4. Strategic Forces Funding as a Percent of Total DoD Funding, 1962-1985

Table III-5. U.S./USSR Non-Strategic Nuclear Modernization Programs

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
Ballistic Missiles			
Pershing II	• Rapid response for time-urgent targets • High mission flexibility and survivability • High accuracy permitting reduced warhead yields and lower collateral damage	Improved SS-20	• Improved accuracy
Ground Launched Cruise Missiles			
Ground Launched Cruise Missile (GLCM)	• Increased theater firepower • Increased survivability of theater nuclear force • Low altitude, low radar cross section, and small infrared signature	SS-CX-4 (GLCM) New Large GLCM Development	• New peripheral attack capabilities; eventual accuracy improvements for non-nuclear applications
Sea Launched Cruise Missiles			
Sea Launched Cruise Missile (SLCM)	• Long range, high accuracy and low RCS for launch and penetration survivability • Ship platform flexibility	SS-NX-24 (Large SLCM) SS-NX-21 (Small SLCM)	• Increased firepower and force multiplier • Standoff capability to attack with reduced warning
Artillery			
W79 8-inch Artillery Fired Atom Projectile (AFAP) W82 155mm AFAP	• Improved safety, security, range and survivability over current projectiles	152 mm nuclear capable, self-propelled and towed	• Improved range • Higher initial rate of fire

targets at risk by our capability to achieve very good accuracy. This offsets the Soviet advantage in throwweight. Further, the potential of the SDI to make ballistic missiles obsolete in the far term may work to help maintain the strategic balance. In the bomber area, our progress in low observable technology for both bombers and cruise missiles will offset the formidable air defense capability of the Soviets and provide insurance against a significant Soviet breakthrough in ballistic missile defense.

Cruise and standoff air-to-surface missiles are also good examples of capabilities derived from our advanced technology. Developments in propulsion, guidance, and miniaturization of components have enabled us to develop systems which offer a significant force multiplier effect, as well as improved flexibility and high survivability. For example, we are developing and deploying sea-launched cruise ~~missile~~ variants capable of both nuclear and conventional attack, which can be launched from submarines, battleships, cruisers, and destroyers. There are similar high leverage technologies in other areas as well. The key point is simply this: our strategy must be to exploit technology for the leverage benefits it provides over Soviet advantages in strategic force mass and capability.

STRATEGIC PROGRAMS GOALS/OBJECTIVES

The primary objective of U.S. strategic forces remains the maintenance of stable deterrence. Our strategic forces must be able to survive a well-executed surprise attack and be capable of retaliating against a wide range of possible targets while retaining a secure reserve force as a further deterrent. The Soviet Union is challenging our basic objective by gaining advantages in critical nuclear force capabilities, thereby threatening our deterrent strategy. To counter the Soviet's growing nuclear warfighting potential, the President has given the highest priority to the modernization of our strategic nuclear forces. In addition, equitable and verifiable arms reduction agreements are being pursued in parallel with these modernization programs. The objective of these efforts is to create a more stable nuclear balance at reduced levels of armament.

U.S. nuclear forces include strategic weapons deployed on land (ICBMs), at sea (SLBMs), and in the air (heavy bombers). These three major force elements comprise the well-known strategic triad. The distribution strategic forces within the triad is a key factor in assessing the deterrent capabilities of our forces compared to the Soviets. Unlike the United States, the Soviets rely on numerous heavy ICBMs which pose the greatest threat to military and civilian targets in our country. Our nuclear forces, in contrast, are more evenly distributed, with the bulk of our nuclear weapons deployed on less powerful and less accurate SLBMs or relatively slow-flying bombers. Thus, U.S. forces are designed only for retaliation, and they lack the needed yield, accuracy and promptness to threaten the Soviets with a credible first strike attack.

Each element of the strategic triad offers differing characteristics in terms of responsiveness, accuracy, control, targeting flexibility, and destructive power. These unique characteristics provide a hedge against a Soviet breakthrough in technology or a breakout from an arms control agreement that might jeopardize the capability of one or more of the other elements. Also, the depth and redundancy of our forces bolster the credibility and effectiveness of our nuclear deterrent and provide us with a range of retaliatory options short of a spasmodic, suicidal response to a Soviet attack. These qualities force the Soviets to account for a multiplicity of threats by developing extensive defensive capabilities against each element.

In the paragraphs that follow, we will outline the objective of each triad element, assess its capability, and report the progress we have made in upgrading it to meet the increasing demands of a credible deterrent posture.

INTERCONTINENTAL OFFENSIVE FORCES

Introduction

In their move toward strategic superiority, Soviet strategic forces continue to grow and improve. The number of strategic nuclear warheads targeted against us has doubled since the SALT II treaty was signed in 1979. In fact, the era of SALT II was a time for rapid buildup of Soviet forces as shown in Figure III-1. Currently, the Soviets have a four to one advantage over us in deployed ICBM throwweight--a useful static measure of force capability. Also, their move to mobile ICBMs continues unabated, with the road mobile SS-25 now operational and the rail mobile SS-X-24 under development.

As regards SSBNs and SLBMs, the Soviets continue their rapid expansion with two classes of ballistic missile submarines, the DELTA IV and TYPHOON. They have been producing an average of 130 SLBMs annually for the past ten years with a strong trend toward longer range and greater accuracy. This gives the Soviets the capability to launch SLBMs against us from waters close to their home ports under the protection of their anti-submarine warfare capabilities and land-based air cover. Thus, this strategy reduces their requirements for "on station" patrols that are more difficult to sustain and defend.

In bombers, the Soviets are producing new BEAR-H cruise-missile-carrying bombers and nearing initial deployment of the BLACKJACK. Contrary to popular belief, the Soviets enjoy an advantage in numbers of cruise missiles, with five new types of air-, sea-, and ground-launched cruise missiles either deployed or in development.

The next paragraphs describe our efforts to reverse these trends.

Land-Based ICBM Forces

The need to modernize our ICBM forces for the tasks of the 1980's, 1990's and beyond still requires near and far term solutions. In the near term, the Peacekeeper ICBM is needed to redress the growing asymmetry between the hardening of Soviet high priority assets and our ability to place these assets at prompt risk. We are now proceeding with a two-phase modernization program involving the silo-based ICBM force with the deployment of 50 missiles in Minuteman silos, and continued research on alternate basing modes, all directed toward a force of 100 deployed missiles. The Peacekeeper flight test program continues on schedule with ten successful test flights to date, the last two from a modified Minuteman test silo at Vandenberg AFB. We are proceeding with our evaluations of more survivable basing modes, including superhard silos, deceptive concepts also incorporating new hardening technology, and the so-called "shallow tunnel" and "carry hard" modes. Recent advances allow us to achieve silo hardness levels far in excess of those ever thought possible. Our work now is focused on reducing costs for these silos. Superhard silo basing would counter the current Soviet threat and help in the transition to longer term solutions involving mobility, deception and/or active defense. The advanced deceptive systems for Peacekeeper are less well developed than superhard silos, but they, too, appear promising.

To enhance strategic stability in the 1990's, the small ICBM program provides for increased survivability due to its adaptability to various basing modes. The superhard silo, hard mobile launchers on DoD land, and hard mobile launcher on Minuteman launch facilities all continue to show promise, and development programs are progressing on schedule. With a planned nine-year development cycle, this program will challenge our capabilities, and we are proceeding with a demanding development schedule to overcome the major technical challenges of low missile weight, lightweight/

accurate/responsive guidance systems, and system mobility and survivability. The development focus is on providing a militarily effective missile and basing combination which would be survivable well into the next century.

The Soviets are upgrading the Moscow ABM system and developing a dual air defense system, the SA-X-12, whose variants are designed to have both an anti-tactical ballistic missile and anti-aircraft capability. To ensure the continued penetration capability of our ICBMs and SLBMs, we have a vigorous effort under the Advanced Strategic Missile System (ASMS) program to develop suitable penetration aids (PENAIDS). In our principal effort, we are beginning development of a PENAID system for the Minuteman III. Test flights of the components so far have been successful, and we are confident it will meet the near-term threat posed by Soviet ABM capabilities.

Soviet efforts toward surviving a nuclear exchange through mobility, hardening, and deep underground emplacement of key warfighting assets make the U.S. strategic targeting problem increasingly difficult. To maintain an effective deterrent posture, U.S. forces must offer the capability to locate, evaluate, target, and strike strategic Soviet targets rapidly. Several projects address this problem, such as the proof-of-principle demonstration of rapid retargeting of Minuteman III, and the development of rapid retargeting of a single warhead Minuteman II. These programs offer the potential for an improved and flexible capability to hold at risk various categories of Soviet strategic relocatable targets.

Sea-Based Forces

The U.S. SSBN/SLBM force possesses the highest survivability of any element of the triad. The security of extended operations at sea provides a high degree of deterrence because the Soviets cannot place the SSBN/SLBM force at sea at risk of a first strike attack. This high degree of survivability makes these weapon systems an important element of our deterrent posture.

Our work in modernizing this element of the triad is proceeding on schedule, with the seventh OHIO-class SSBN-732, the USS Alaska, entering sea trials in September 1985. The sixth TRIDENT submarine, the USS Alabama (SSBN-731), was commissioned and accepted by the Navy in May 1985. We are confident the superb technology of these SSBNs will ensure a reliable SLBM deterrent well into the next century.

The engineering development of the TRIDENT II (D-5) SLBM is proceeding toward the goal of a December 1989 Initial Operational Capability (IOC). We expect the first flight test early in 1987, and an aggressive flight test program before IOC will validate the complete range of flight conditions. The IOC is planned for Kings Bay, Georgia, aboard SSBN-734. Twenty test flights are currently planned from a launch pad and ten from an SSBN.

Bomber/Cruise Missile Forces

An effective bomber force is essential to our deterrent because its unique characteristics complement the ICBM and SLBM elements of the triad. Manned bombers have a high degree of flexibility, are adaptable to various situations, and are fully mobile. During a crisis, bombers can be launched under positive control, dispersed to satellite bases, or placed on airborne alert. Their long flight times make bombers excellent retaliatory (as opposed to first strike) weapons, and their visibility and flexibility make them effective for demonstrating political will. The U.S. bomber force will have a mix of modern bombers that can penetrate Soviet airspace carrying short range missiles and gravity bombs, with others carrying long range cruise missiles for launch outside the range of Soviet air defenses.

Our major initiatives in this area, the B-1B and the Advanced Technology Bomber, remain on schedule. We are now deploying the B-1B bomber with the IOC planned for September 1986, at Dyess AFB, Texas. Production will peak at four aircraft per month, and all 100 aircraft will be delivered by mid-1988. The program remains under the $20.5 billion cost ceiling (FY 81 $) and ahead of the contract schedule. We are completing plans to qualify the aircraft for cruise missile launch.

Details of our progress and schedule for the ATB program remain classified; however, we are highly pleased with the development program to date and no major problems have emerged to slow our work. The program is proceeding smoothly toward the first ATB test flight and a production decision. The low observable technologies involved in the ATB program represent significant advances in our efforts to overcome increasingly capable Soviet defenses and will extend the effectiveness of the penetrating bomber element of the triad well into the next century.

Another important initiative in this area is the new Short Range Attack Missile (SRAM II) which provides the bomber force with an improved capability to attack defended targets and to suppress enemy defenses while remaining outside the lethal defense zone. The current SRAM-A is aging out (after 14 years of service) and does not provide sufficient bomber standoff range, routing flexibility, and lethality to offset increases in Soviet air defense capability and the changing Soviet target base. SRAM II will overcome these deficiencies and greatly add to our capability to hold Soviet strategic relocatable targets at risk. Technically, we just completed our propulsion and size selection by deciding on rocket in lieu of ramjet propulsion (because of its lower cost), and a size two-thirds that of SRAM-A (to increase bomber carriage and improve weapon survivability). After a comparative source selection, we will award a full scale development contract for SRAM II.

To ensure the continued effectiveness of our cruise missile forces, we are well into successful development of the Advanced Cruise Missile (ACM), which will be deployed later in the decade. The additional range, higher survivability (because of reduced radar observables), and increased accuracy of this weapon will all work to further enhance the capabilities of our bomber force. In conjunction with the currently deployed ALCM, the ACM will round out our ability to cover the complete spectrum of strategic cruise missile targets.

-Some capabilities within our strategic nuclear forces provide wide application for force projection missions, from a demonstration of resolve to full-scale theater warfare support. An important initiative in this area is the Strategic Conventional Standoff Capability (SCSC), which is intended to exploit the long-range, high-payload capability of the B-52 bomber and off-the-shelf sensors and conventional weapons to provide a capability for interdiction, deep strike, maritime anti-surface warfare, mine laying, etc. Two squadrons of our B-52G's are now equipped with the HARPOON anti-ship missile, and the SCSC program will greatly supplement this capability.

STRATEGIC DEFENSIVE FORCES

The Soviets continue to increase their active and passive defenses against the broad range of conventional and nuclear weapons. Active defenses use weapon systems to protect national territory, military forces, or critical assets. Passive defenses are measures such as civil defense, hardening, dispersal, and underground basing, which are increasingly being used by the

Soviets to protect key assets against attack. These measures contribute to the Soviet's war-winning and survival strategy by providing a modernization and post-attack capability far superior to ours.

In active air defense, the Soviets have nearly 12,000 surface-to-air missile (SAM) launchers at over 1200 sites, 10,000 air defense radars, and more than 1200 interceptor aircraft dedicated to strategic defense. An additional 2800 interceptors assigned to the Soviet Air Force would also be used in strategic defense missions. In contrast, the U.S. has approximately 300 interceptor aircraft, no SAM systems, and 118 strategic air defense warning radars.

In missile defense, the Soviets maintain the world's only operational ABM system around Moscow. When completed, the modernized Moscow ABM system will be a two-layered terminal defense composed of silo-based, long-range interceptors for exoatmospheric intercepts, high-acceleration interceptors intended for targets within the atmosphere, along with a large new radar designed to control ABM engagements. The Soviets also have the world's only operational anti-satellite system.

The Soviets have had for some time a substantial research program on advanced technologies for defense against ballistic missiles. This program covers many of the same technologies involved in our Strategic Defense Initiative (SDI) program, but involves a far greater investment in people, funding, and facilities.

U.S. strategic defensive systems will reduce the potential effectiveness of Soviet nuclear attacks and add uncertainty to the possible outcomes of an attack, thus undermining Soviet confidence in success. Current U.S. strategic defenses include air defense forces and ground and space-based surveillance systems.

Our major initiative in the surveillance and warning area is the Over-the-Horizon Backscatter (OTH-B) radar system intended to provide long-range, all-altitude coverage against enemy bombers and cruise missiles. We will be deploying OTH-B sectors in the east, west, central U.S.; and Alaska with IOCs stretching out through the early 1990's. When combined with the North Warning System, (which is to repalce the obsolete DEW line) OTH-B will provide the U.S. with a credible attack warning capability to increase the survivability of our strategic retaliatory forces.

In space defense, our Anti-Satellite (ASAT) program had a notable success in September 1985, when it intercepted and destroyed a satellite over the Pacific Ocean. The ASAT is comprised of the Miniature Vehicle (MV) which is air-launched from an F-15 aircraft using a SRAM/ALTAIR booster. Further tests planned this year against an Instrumented Test Vehicle (ITV) to provide detailed data on the actual intercept are under suspension by the Congress. Consistent with previous congressional authorization, on 12 December 1985, we placed into orbit two ITV's which have a limited lifetime. If the present congressional decision stands and testing is prohibited, the taxpayers will lose approximately $20 million invested in the launch of these targets. As the Secretary of Defense has stated, this congressional action could also undercut arms control and impair our national security. We hope Congress will work with us to take corrective action and promptly restore our ability to conduct these tests.

By the mid-1990's, intelligence estimates indicate the potential for a significantly increased Soviet strategic intercontinental bomber threat. Effective strategic missile defenses would still leave the U.S. exposed to attack by bombers and cruise missiles. Thus, corresponding options for effective air defenses against bombers and cruise missiles are also needed. This year, we are beginning an initiative to define the specific technologies and programs needed to gradually build a robust defense against Soviet bombers and cruise missiles.

Strategic Defense Initiative

The SDI is a vigorous research program being conducted in compliance with the 1972 ABM treaty. It is intended to assess the potential for advanced technologies to provide effective strategic ballistic missile defenses, and to support a decision on whether to develop and deploy advanced defensive systems . As a broad research program, the SDI is based on identifying options for an effective defensive system. Thus, a broad range of different concepts, involving a wide range of technologies, is being examined. No single concept or technology has been identified as the best or most appropriate. It is clear, though, that a layered defensive system would be able to provide many opportunities to destroy attacking nuclear warheads well before they approach our territory or that of our allies.

The interim results of architecture studies conducted last year show that kinetic energy weapons hold the highest promise for near-term systems using combinations of space-based and ground based kinetic hit-to-kill type weapons. On the other hand, directed energy weapons hold high promise for interactive discrimination and countering advanced threats. An evolutionary program, therefore, that combines the most promising near-term kinetic energy kill concepts with a longer-term program designed to exploit directed energy technologies appears very promising.

An effective strategic defense system will also require robust sensors, capable of detecting and tracking threat objects and of discriminating among reentry vehicles and decoys. Studies are progressing on defining battle management/command, control and communications architectures for strategic defense. They are indicating that a decentralized approach will have many critical advantages.

NON-STRATEGIC NUCLEAR FORCES

The increasing Soviet buildup in theater forces makes our job of developing responsive Non-Strategic Nuclear Forces (NSNF) more essential than ever. These forces are essential because they show our firm resolve to defend U.S. and allied interests across the full spectrum of possible conflicts, and deter aggression by the Soviet/Warsaw Pact forces.

The Soviets are proceeding with their steady expansion in theater forces in every major conventional category–tanks, artillery, helicopters, missiles, etc., and also in the nuclear category where more than 400 SS-20 missiles have been deployed, with each missile having three nuclear warheads, and each system having a reload capability.

While the Soviets continue their steady expansion, we, and our allies, continue to exercise considerable restraint. For example, in 1979 a decision was agreed to by the NATO allies that called for the removal of 1,000 warheads from the NATO nuclear stockpile and the deployment of a combined total of 572 ground-launched cruise missiles (GLCMs) and Pershing II ballistic missiles, beginning in 1983. The decision further stipulated withdrawal of a presently deployed nuclear weapon for each new GLCM or Pershing II deployed. In October 1983, NATO defense ministers, meeting at Montebello, Canada, also agreed to withdraw an additional 1,400 warheads from Europe over the next several years.

As a result of the 1979 and 1983 decisions, five nuclear weapons will have been withdrawn from the NATO nuclear stockpile for every GLCM or Pershing II deployed. Thus, NATO will have cut its nuclear arsenal to its lowest level in 20 years. In contrast, the Soviet buildup in intermediate-range and shorter range nuclear weapons has continued unabated.

We, along with our allies, are just now beginning to upgrade our NSNF in response to the impressive force expansion by the Soviets. For several decades, our efforts have not kept pace; however, with the deployment of Pershing II and GLCM, we are beginning to reestablish viable deterrent capabilities. The Pershing II deployment to U.S. forces in Europe was completed in 1985 with a total operational force of 108 missiles. This missile, with its range of 1800 kilometers, has replaced the shorter-range Pershing IA.

GLCM has other capabilities that complement those of the Pershing II. With its longer range of 2500 kilometers and decreased need for rapid response time, the GLCM can be based further to the rear for increased survivability. Deployment of GLCM will be completed by 1988 with 464 missiles in place.

In addition to the GLCM and Pershing II, Artillery Fired Atomic Projectiles (AFAPs) play an important role in battlefield deterrence. AFAPs have provided a vital part of NATO nuclear deterrence and warfighting capability for over 30 years by providing the means to stop advancing ground forces. However, modern AFAPs are required to offset recent Soviet increases in both their conventional and nuclear forces. A viable AFAP capability in NATO will greatly influence Soviet estimates of Warsaw Pact probabilities of successful attack and hence contribute to deterrence.

The W79 modernized 8-inch projectiles have been in production since 1981. The DoD has also developed, and Congress has approved, a plan to produce modernized W82 155mm projectiles in accordance with modernized AFAP quantity and cost ceilings established by the DoD Authorization Act of 1985. With continued support by the Congress, we can deploy this improved round on schedule.

With respect to the longer term, our goal is to ensure that modernization of our NSNF is complementary with improvements in the capabilities of our conventional forces. In both conventional and non-strategic nuclear forces, the long term trend will be toward the development of longer range systems to enable these forces to be more widely dispersed for survivability while still permitting the attack of deeper targets. Our goal is to improve our conventional forces to enhance NATO's capability to deter Soviet conventional aggression, as well as to reduce possible pressure for early NATO use of nuclear weapons. In this regard, we will continue to evaluate the suitability of replacing nuclear weapons with non-nuclear munitions, wherever feasible.

Corresponding improvements in our NSNF posture will further reinforce NATO's capability to deter Warsaw Pact conventional aggression as well as Soviet use of nuclear weapons. Toward that end, we will pursue the development of such systems as a follow-on to the current Lance, a tactical standoff air-to-surface missile, and a nuclear Surface-to-Air Missile (SAM) for maritime force defense.

Navy systems also contribute significantly to our improved non-strategic force posture. The family of TOMAHAWK cruise missiles, for example, provides a nuclear and conventional land attack and a conventional anti-ship capability from both submarines and surface ships of the fleet. This year, we began deploying conventionally armed TOMAHAWK cruise missiles aboard surface ships and submarines.

Efforts continue to improve the security and survivability of nuclear weapons, with emphasis on the European Theater where the threat is growing. For example, we are developing a program to establish more extensive concepts, procedures, doctrine, training, hardware, and facilities to assure the survivability of NSNF. A long-range look into future threats and survivability improvements required in the next century will be conducted. The NATO Senior Level Weapons Protection Group has adopted a long-range planning document which contains not only policy guidance, but also recommended security and survivability measures, some of which have already been endorsed by NATO Ministers. This posture guidance document will provide needed direction for NATO programs well into the future.

NUCLEAR WEAPONS

Goal

The goal of the nuclear weapons program is to provide and maintain a safe, secure, survivable, and effective nuclear weapons stockpile in support of U.S. national security objectives. Several initiatives are being pursued in support of this goal. We are continuing the design and production of nuclear weapons to support our strategic modernization initiatives and to replace obsolete weapons with new designs which are inherently more effective, safe, secure, and survivable. We will retrofit selected stockpiled weapons with current technology to improve overall safety and command and control. We will not attempt to match the Soviets weapon for weapon (see Figures III-5 and III-6), but will continue our focus on quality across the full range of deterrent nuclear forces.

We are working with the Department of Energy (DoE) to strengthen our nuclear weapons technology base. We are also developing long-range plans that will allow us to meet future defense needs. These plans consider the constraints of limited resources or potential requirement changes that could result from either a major nuclear threat increase, technological surprise, a new arms control agreement, or a change in national strategy.

Major Achievements

One of the major achievements of the past year is the continuation of the nuclear weapons modernization program in cooperation with the DoE. As mentioned earlier, the GLCM and Pershing II nuclear weapon systems

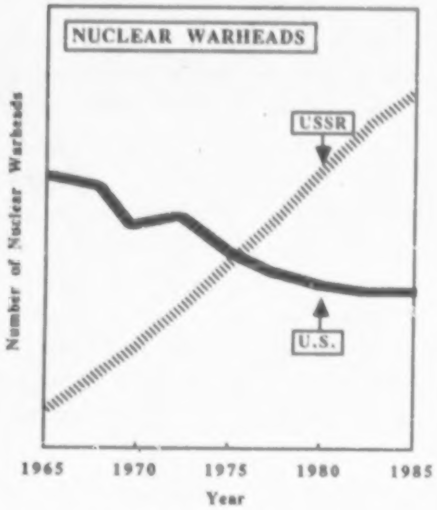


Figure III-5. U.S. and USSR Nuclear Warheads, 1965-1985

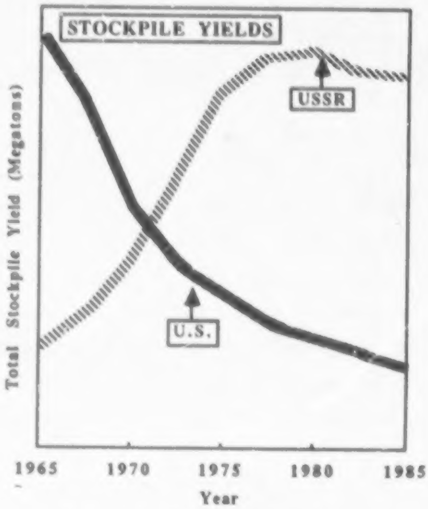


Figure III-6. U.S. and USSR Total Stockpile Yields, 1965-1985

deployments are examples of this modernization program.

The biennial Nuclear Weapons Development Guidance (NWDG), which provides DoD guidance to the DoE for long-range R&D planning, was completed and presented to the DoE. While addressing the nuclear requirements for the 1990's, special emphasis was placed on improving the accuracy of our forecasts and in extending the technology projections 10 to 20 years into the future.

Technology Efforts

Efforts continue at both the DoE and the DNA to assess the survivability of military systems in nuclear environments, especially in light of more accurate Soviet missiles; to develop technology to enhance the survivability and security of U.S. forces; and to provide new technology for the intelligence community to predict destruction thresholds of enemy systems. Programs underway to upgrade the technology include underground nuclear and above ground high explosives testing, nuclear effects simulators, computer codes, exo-atmospheric experiments, and the analysis of U.S. nuclear capabilities, including advanced concept directed-energy vulnerability assessments. A research program for assessing the climatic effects of nuclear war will continue.

The underground nuclear test MISSION CYBER, in support of the Navy Trident II, and MISTY ECHO, a cratering and ground shock event, will provide an assessment of the vulnerability of strategic structures to nuclear attack, ensure optimum targeting of warheads, and provide timely data to support the evaluation of alternative Peacekeeper basing modes.

Current Objectives

In response to recommendations made in the Report of the President's Blue Ribbon Task Group (BRTG) on Nuclear Weapons Program Mangement, completed and delivered to the President and to Congress in July 1985, we are working closely with DoE to ensure that fiscal discipline continues to receive high priority in our weapons development. For example, we have proposed new arrangements for joint DoD/DoE senior level management reviews of nuclear weapons programs and budgets, with new opportunity for tradeoffs between departments related to nuclear weapons and other defense programs. Also, we are continuing to emphasize cost factors during the development of new nuclear systems through formal interdepartmental agreements on cost baselines and more dedicated to obtaining and maintaining clear military superiority. In response, we must sustain the effectiveness of our deterrent posture over time. We have a program for modernizing our nuclear forces and we now need the continuing commitment to bring that program to fruition in the years ahead.

It is also important to continue pursuing arms control and arms limitations agreements with the Soviets--agreements that provide for mutually verifiable limits. Until such agreements are realized, however, we must maintain a vigorous and technologically advanced program of research, development, and testing as the surest way of guaranteeing deterrence and encouraging meaningful arms control negotiations.

LOOKING TO THE FUTURE

There is no more urgent task facing Americans than to restore and then maintain the strategic balance. Matching the Soviets system by system, number by number, is not the answer. We must exploit our innate advantages in technology that are fostered and nurtured by our free society to provide the leverage required to maintain the balance, yet stay on a reasonable economic course for the country. The Strategic Modernization Program and the Strategic Defensive Initiative are thorough management reviews of the cost characteristics of each system.

It is essential that we define the character of the future stockpile in view of improved weapon systems capabilities and changing requirements. We must also continue to improve upon the survivability and endurance of our forces and support infrastructure--both in CONUS and abroad. In addition, we plan to determine the feasibility and suitability of applying nuclear directed-energy technology to specific weapons applications. Finally, the modernization of the capital plant and infrastructure for nuclear weapons and weapons materials research, development and production must continue. In future years we must more fully consider total weapon system cost and performance in establishing military requirements and design objectives for nuclear weapons.

Challenges and Opportunities

Within the nuclear weapons area, the greatest challenge continues to be our country's will to stay the course in modernizing our stockpile. We are faced with a formidable adversary who possesses steadily increasing capabilities, yet is rarely subject to changing military strategy or wide variations in funding. The Soviets are not content to maintain parity, but are central to this effort. The high technology efforts within these programs, such as low observable technology and directed energy concepts, provide the leverage to maintain our deterrent posture. As these critical programs continue to unfold we can face the future confident of our ability to preserve peace with freedom.

IV. TACTICAL WARFARE PROGRAMS

INTRODUCTION

The primary objective of our Tactical Warfare Programs is to provide a credible conventional deterrent for our forces worldwide. Our primary areas of concern are Central Europe, Korea, and Southwest Asia; but we must have the capability to respond to contingencies in other areas as well. Ongoing tactical warfare programs are aimed at modernizing our weapons systems and filling munitions inventory objectives for a wide range of general purpose land, air, and naval forces. In all of these areas, we are attempting to apply emerging technologies selectively to create new, high leverage capabilities at affordable costs in order to take advantage of our basically defensive posture. These high-leverage capabilities emphasize low observables and smart weapon technologies that will render large portions of the threat obsolete. One of the major thrusts in tactical warfare is the "Conventional Initiatives" package of programs that is aimed at providing the capability to both see and strike deep, denying enemy forces surprise, and threatening them throughout the length and breadth of the battlefield. In addition, there are important improvements underway in each of the major warfare areas--land, sea, and air--that are aimed at providing an effective deterrent to attack by any potential adversary.

CONVENTIONAL INITIATIVES

The key ingredient to our Conventional Initiatives effort is the deep surveillance and strike program which supports the Airland battle and the Follow-on Force Attack concept. This program consists of a series of Joint Service, principally Army and Air Force, standoff and penetrating systems incorporating a variety of advanced technologies including low observable technology, smart munitions for top attack of armored vehicles, new all weather real-time acquisition, and micro-processing for improved data handling. The impact of these technologies is to greatly enhance our conventional defensive capability throughout the depth of the battlefield, by increasing both firepower and survivability, without increasing force structure.

The programs that constitute the core of this program are the Joint

Surveillance and Target Attack Radar System (Joint STARS), the Joint Tactical Missile System (JTACMS) and the Army Tactical Missile System (ATACMS), the Joint Tactical Fusion Program (JTFP), and the Joint Suppression of Enemy Air Defense (JSEAD).

The Joint STARS (Air Force lead) is a multi-Service, multi-function radar that has a Moving Target Indicator surveillance mode, Fixed Target Indicator spot mode, and a weapons guidance mode. The ATACMS (Army lead) is the weapons program that provides an extended range strike capability by a correctable-trajectory ballistic missile for attacking maneuver forces. It is augmented by the JTACMS (Air Force lead).

In the Air Force, these near real time attack assets will be managed through a Ground Attack Control Center (GACC). In the Army a deep strike cell combining the same standoff sensors as the GACC will be the Fire Support Element (FSE). Again, the Joint STARS will be the hub while JTFP will serve as the key target nomination source. Joint STARS will be a primary sensor input to the GACC and FSE.

The Air Force lead JSEAD and its Precision Location Strike System (PLSS), is a major component which must be integrated into the system architecture. The JSEAD is a set of tri-Service, fully coordinated programs involving both lethal and non-lethal means to suppress and/or destroy enemy air defense, associated C^3, and jammers.

Particularly important, as the Soviets expand the scope of their Operational Maneuver Groups (OMGs), the long range strike capability will provide lateral fires, across Corps boundaries to prevent breakthrough on the flanks. These weapons, launched either from aircraft or by ground systems, will also be used to attack command and control nodes, transportation choke points, airfields and other vital targets .

The lethality of the strike program is made possible by the smart munitions achievements. Soviet ground force equipment is susceptible to targeting by any of the three basic types of existing and proposed "supersmart" terminal guidance concepts: fly-over shoot-down; loiter-search shoot-down; hit-to-kill. Any of these types of munitions could include activating mechanisms, singly or in combination, employing technologies such as optical contrast, infrared, semi-active laser, imaging or pseudo-imaging, passive millimeter wave and active Millimeter Wave Radar (MWR).

A wide range of submunition candidates exist, from cluster bomblets to precision terminally guided submunitions. Area bomblets already in the field can be very effective when delivered accurately against many types of targets. Sensor fuzed munitions, e.g., warheads fuzed by relatively inexpensive sensors such as Sense and Destroy Armor (SADARM) are in development. Sensor fuzed munitions accurately delivered are extremely effective against any target type. These can be dispensed from a variety of air or surface delivered munition carriers. The most mature submunition concept which has been demonstrated is the autonomous hit-to-kill submunition. Such terminally guided submunitions after being dispensed from the carrier vehicle, select an individual target within their field of view and maneuver to selectively engage these targets.

These technologies, now being deployed or under system development, will dramatically improve conventional defense capability and enable day/night, all-weather engagement against moving and short dwell maneuver targets as well as interdiction of fixed targets. Attacks at the time of the Commander's choosing will have the direct effect of raising the nuclear threshold and the synergistic effect of increasing the credibility of our nuclear force posture. The overall impact of our improved conventional defense posture will enhance deterrence.

Implicit in increasing conventional deterrence is the need for our NATO llies to acquire these capabilities, for our success depends on effectiveness in the central battle and in the attack of follow-on forces across the entire front.

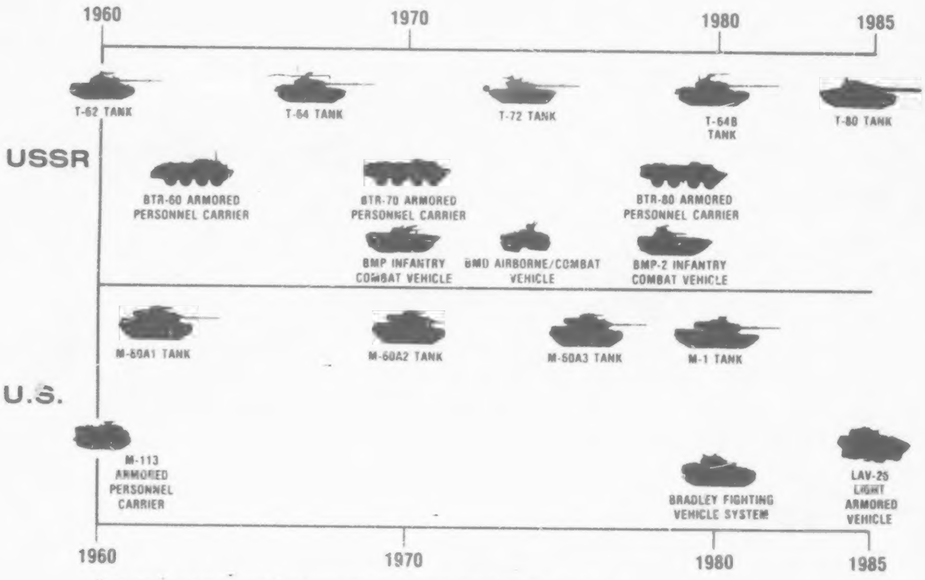
LAND WARFARE

The past 15 years have seen technological improvements in Soviet military equipment, an expansion in the size of their ground forces, and numerous organizational changes; all of which are part of the sustained effort by the Soviets to improve and expand their ground forces. This Soviet modernization directly challenges past U.S. qualitative superiority in ground combat forces. New Soviet tanks, armored vehicles, attack helicopters, self-propelled artillery, and surface-to-surface rockets and missiles, along with new guided munitions for all of these categories of weapons, pose major threats to U.S. ground combat forces. Countermeasures, decoys and wide spread use of deception techniques will be necessary to enhance force survivability. Rapid introduction of more effective weapon systems and munitions using emerging technologies will be necessary to regain the past U.S. qualitative advantage.

Soviet ground forces include over 52,000 main battle tanks in the active inventory, of which more than one-third are modern T-64/72/80 series. Figure IV-1 shows highlights of the modernization efforts of the U.S. and USSR in armor systems since 1960. Artillery modernization efforts are highlighted in Figure IV-2.

The Soviets also plan to upgrade and expand their helicopter force to include a new helicopter currently in R&D which is similar to the U.S. Army Apache. Additionally, the Soviet inventory of infantry carriers, short range missiles, surface-to-air missiles and large caliber multiple rocket launchers continues to be modernized.

Table IV-1 shows some of the current land warfare modernization efforts by the U.S. and USSR with qualitative trends.



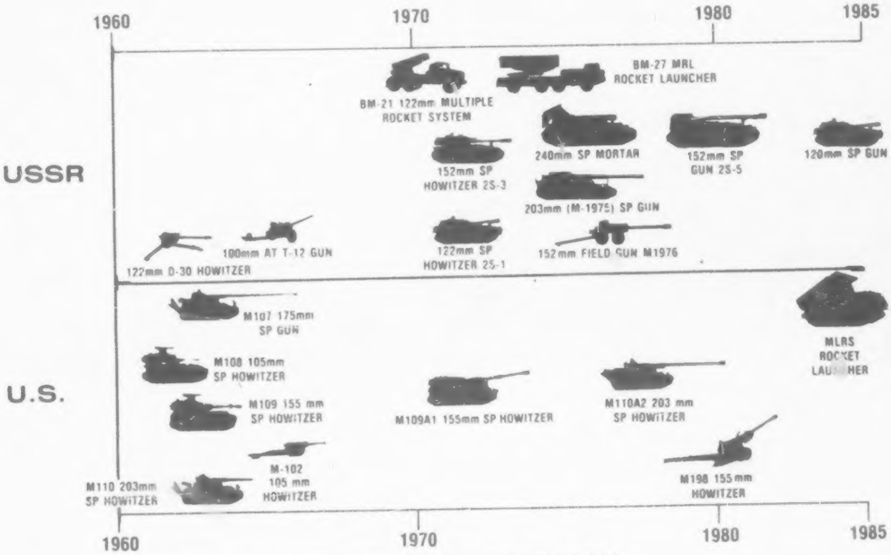
Tanks shown are both new models and major modifications. Other systems are new models only.

Figure IV-1. New and Modified U.S. and USSR Armor Systems, by IOC Date, 1960-1985

The Soviet Union and Warsaw Pact continue to outproduce the U.S. and NATO in every major category of ground combat weapon, with the exception of anti-aircraft artillery (Table IV-2).

In the close combat mission area, modernization of our tank and mechanized infantry forces continues at a high rate. The M1A1 Abrams tank with the 120mm gun, improved protection, and new Nuclear Biological and Chemical Protection systems, is now in production. Approximately 3,000 Abrams tanks, with the 105mm cannon, have been produced to date. Our inventory objective is 7467.

Recent evaluations, including a Defense Science Board (DSB) Summer Study or the U.S./Soviet armor anti-armor competition, has focused attention on the need to upgrade our tank weapons and protection. The Army is investigating a series of initiatives designed to improve the lethality of our fleet of tanks.



Tube artillery shown are 100 mm and over. *Both new models and major modifications are included*

Figure IV-2. New and Modified U.S. and USSR Artillery Systems by IOC Date, 1960-1985

TABLE IV-1. U.S./USSR Ground Combat Weapons and Vehicles, Modernization Programs*

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
Surface-to-Air Guns and Missile Systems			
Patriot Surface-to-Air Missile System	• Simultaneous engagements • Effective in intense ECM environments • Increased mobility	SA-11, Low-to-Medium Altitude SAM System	• Has on board radar for increased mobility and target handling capability
Stinger, Man-Portable	• Identification, Friend or Foe • All-aspect target engagement	SA-X-12, Gladiator SAM System **	• Capability to engage tactical missiles as well as high performance aircraft.
		SA-13, Gopher SAM System	• Added mobility of armored regiments with track mounted transporter-erector-launcher (TEL)
		ZSU-23-4 Follow-on Self-propelled Anti-Aircraft Artillery	• Improved mobility, lethality and accuracy
Armor			
Light Armored Vehicle (LAV-25)	• More maneuverable • Improved weapon accuracy • Lightweight, assault capable direct fire support weapon	T-80 Tank	• Survivability versus chemical attack, nuclear effects • Tank launched ATGM • Substantially improved ballistic protection
Guns, Artillery and Rocket Systems			
Multiple Launch Rocket System (MLRS)	• Suppression of enemy artillery and air defense • Improved follow-on warheads	152-mm Gun	• Enhanced firepower • Dual conventional/ nuclear capability
Surface Launched Anti-Tank Missile Systems			
Tow 2	• Increased warhead lethality • Ability to track through fog and smoke	Anti-Tank Guided Missile with Millimeter-wave command link	• Improved capabilities in range and lethality

*See Table IV-6 for Attack Helicopters.

**Also included in strategic defensive modernization comparison in Chapter III.

Table IV-2. Production Summary of Selected Land Force Systems for NATO and Warsaw Pact Forces, 1976-1985*

Category	1976-1985 Annual Average				1985				10-Year Trend	
	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR
Tanks	735	2360	1240	2750	1375	2700	1925	3200	↑	↑
Other Armored Vehicles (Infantry Combat Vehicles)	860 (210)	4840 (3440)	2010 (380)	5600 (3760)	1700 (655)	3500 (2500)	3800 (1055)	3800 (2500)	↑ ↑	— —
Artillery, Mortars & Rocket Launchers (100mm and over)	214	2860	484	3185	330	4100	430	4650	↑	↑
Anti-Aircraft Artillery	6	85	444	200	25	100	75	175	—**	—

* See Table IV-5 for attack helicopters.

** Sgt York production cancelled beyond 1985.

Approximately 2,000 Bradley Fighting Vehicles have been produced of the planned total of 6,882. Survivability enhancements for Bradley, to keep pace with advances in the threat, are being considered at this time. Additional live fire tests are scheduled for early 1986 to evaluate design changes and product improvements necessary to increase survivability.

The Light Armored Vehicle (LAV-25) is the Marine Corps lightweight direct fire support weapon system. Initial Operation Capability of the LAV-25 was achieved in July 1984. The last of the 758 vehicles scheduled for procurement will roll off the production line in June 1987.

The vehicles which will replace all of the quarter ton through five-quarter ton trucks are the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) and the Commercial Utility Cargo Vehicle (CUCV). The multi-year production contract for the HMMWV was awarded in March 1983 with the Initial Operational Capability (IOC) achieved in September 1985. The multi-year production contract for the CUCV was awarded in July 1982 with full IOC capability achieved in July 1984.

Infantry anti-tank forces represent a vital component of the close combat mission area. Recent advances in Soviet tank armor have seriously degraded the capabilities of our family of infantry anti-tank weapons including LAW, Dragon and TOW. As a result, the department continues, on a high priority basis, to pursue programs to improve or to replace these systems with others that have increased lethality, accuracy, and effectiveness.

In the near term, TOW 2 production and TOW 2 lethality enhancements will have a substantial impact on infantry effectiveness against threat armor. Simultaneously, the Army and the Marine Corps will be acquiring the Swedish AT-4. The Army is reviewing possible approaches to procure the Shoulder Launched Multi-Purpose Assault Weapon (SMAW) (currently being procured by the Marine Corps) to improve individual soldier's effectiveness against the full spectrum of targets. A joint Army and Marine Corps effort is also underway to improve the effectiveness of Dragon.

In the far term, there are a number of promising technologies that have the potential of offering significant enhancements in force survivability and effectiveness. Programs such as the proposed replacement for the Dragon system (the Advanced Antitank Weapon System - Medium), the hypervelocity missile, and the Fiber Optic Guided Missile (FOG-M) offer extended engagement ranges, reduced gunner exposure, and enhanced lethality. The hypervelocity missile offers a new Kinetic Energy (KE) kill capability to infantry anti-tank forces. FOG-M has the potential of defeating enemy helicopters and armor (and other targets) at an extended range even when the targets are not within line-of-sight. The system is currently in Advanced Development but has demonstrated a sound technical basis for an accelerated program. The FOG-M allows an operator to "fly" a ground launched missile at extended range and to "see" a wide field of view through quality video. The operator can zoom in on a target and fly the missile to impact. The excellent potential of the FOG-M and the possible transfer of the technology to other systems is a significant factor in accelerating this effort.

Some of the most dynamic modernization efforts in the U.S. Army are being made in the Air Defense mission area. Patriot fielding is well underway with the initial units activated in U.S. Army Europe. The cooperative air defense program with the Federal Republic of Germany (FRG) will ensure the execution of the FRG's Patriot program and provides point air defense protection--with FRG manned Roland--at U.S. main operating bases in the FRG. Similarly, U.S. air bases in Great Britain are defended by British-manned Rapier Missiles. Product improvements maintain HAWK as an effective system against the evolving air threat and improve its efficiency. Research and development efforts for an Anti-Tactical Missile (ATM) capability to counter the growing conventional tactical ballistic missile threat are continuing.

In the Forward Area Air Defense (FAAD) arena, the Army has re-evaluated its doctrine and needs, following the cancellation of SGT York, and has developed an innovative concept that systematically addresses the issue from an overall force standpoint. Counterair to protect maneuver forces is to be a joint and combined effort utilizing all applicable assets (Air Force, Army, intelligence, electronic warfare, as well as dedicated air defense systems) to defeat the air threat. The execution of this new concept will rely upon an effective Command, Control, and Communication (C^3) system with a ground and airborne sensor capability and reliable identification means to detect and identify hostile aircraft rapidly and immediately distribute that information to weapon systems. These capabilities are embedded in FAAD C^2I (formerly SHORAD C^2).

The remainder of the FAAD suite will consist of three additional ingredients: Line-of-sight weapon capability to defeat both fixed and rotary wing aircraft before they can deliver ordnance, a non-line of sight capability to reach into enemy territory to neutralize helicopters attempting to seek sanctuary in areas masked by terrain, and enhancements to existing combined arms systems to increase their effectiveness in countering attack helicopters. Several existing systems (prototype and production) have the potential to meet the line of sight needs. Demonstrated technologies such as FOG-M can fill the non-line of sight requirement.

Threat artillery advantages include both greater quantities and capability. The U.S. forces are now outnumbered and outranged. In answer to this critical shortfall, the Army has undertaken a Howitzer Improvement Program (HIP). The HIP will significantly increase projectile range and the mobility of 155mm Self-Propelled (SP) artillery, while also reducing the time required to initiate a fire mission. The program also adds automatic gun positioning and will improve system reliability and maintainability, survivability and NBC protection.

To increase effectiveness of artillery fire, the Army is developing the Advanced Field Artillery Tactical Data Systems (AFATDS) as a replacement for TACFIRE. The

AFATDS will increase the speed of operation, survivability and flexibility of the Command Control/Fire Direction System. In conjunction with AFATDS and the HIP program, the Army is also developing a Modular Azimuth Positioning System (MAPS). The MAPS will be an interchangeable standard modular navigation system for installation in SP weapons. MAPS will allow a significant improvement in flexibility of movement of SP weapons since the position and azimuth of each weapon will be known to the Fire Direction Center and to each individual weapon.

To increase firepower against armor, enemy artillery and other targets the Army is planning to use SADARM, sensor-fuzed submunitions in the 155mm howitzer system.

The Army is also increasing the lethality of the Multiple Launch Rocket System (MLRS) by adding a Terminally Guided Warhead (TGW) to the system. Each MLRS missile will carry six Terminally Guided Submunitions. The TGW will be autonomous, terminally homing and capable of defeating armored vehicles at medium to long range. A priority program for using SADARM with the MLRS is also underway. This initiative will take full advantage of SADARM as a fire-and-forget, autonomous munition with the ability to search an area, locate, and attack hard point targets.

Considerable improvement in the effectiveness of our firepower can be achieved by use of remotely piloted vehicles. The Army's AQUILA program is designed to provide "eyes" over the battle area and the capability to pick out targets of value and designate them for attack by laser guided munitions or provide cuing to systems such as FOG-M. The Navy/Marine Corps are also entering a program to provide reconnaissance and fire adjustment capability for their assault forces by means of a remotely piloted vehicle.

Our ground forces rely heavily on rotary wing aircraft (rotorcraft) to provide tactical mobility and highly responsive fire power. In addition, rotorcraft perform a number of support missions. The rotorcraft fleet consists of close to 10,000 helicopters of some 15 different types and over 37 model variants. While this fleet is owned by the four military Services, most of the aircraft (83%) belong to the Army. As the fleet ages--the average age of the Army's fleet is 13 years--it becomes tactically obsolete and more costly to operate. We are countering this trend with a number of product improvements and new acquisition programs.

The attack helicopter fleet constitutes slightly over 10% of the inventory and consists primarily of the Cobra (AH-1) series of gunships. Since its introduction in the 1960's, the AH-1 has undergone numerous modifications by both the Army and the Marine Corps to improve its tactical utility and survivability. The current product improvement programs are the C-Night upgrade which provides night capability for the Army's TOW-carrying AH-1S's and a major performance upgrade for the Marine Corps' AH-1T's to increase their engine power and to allow for the firing of the Hellfire laser guided anti-armor missile as well as the TOW missile. The Marine Corps program also provides air-to-air capability by incorporating the Sidewinder missile. The ongoing Apache (AH-64) acquisition program provides a major upgrade of the Army's attack helicopter fleet. Compared to Cobra, the Apache will provide large improvements in targeting, lethality in killing armored vehicles, and night operations. In addition to this program, the Army is in the early stages of developing a new light helicopter, the LHX, that will replace a large fraction of the aging fleet and provide new capabilities for scout, attack and utility missions that will counter emerging and projected threat developments. LHX will exploit a number of maturing technology based programs including: (1) new materials that are lighter, more ballistically tolerant and more temperature resistant; (2) simplified, yet more efficient and capable cockpits to allow single pilot nap-of-the-earth operations in day/night/adverse weather; and (3) more effective maintenance diagnostics/system monitoring capability to decrease maintenance demands. Other areas where maturing technology is rapidly becoming available include reduced signatures to minimize aircraft detectability, therefore increasing survivability, and more robust subsystems capable of withstanding adverse operating conditions.

Over 2,000 of our light helicopters are dedicated to the scout, command and light utility missions. Improvements to this fleet are made through the Army Helicopter Improvement Program (AHIP) which will modify a portion of the OH-58C inventory providing them with increased flight performance and a day/night target acquisition and designation capability.

NAVAL WARFARE

As measured by numbers of ships and procurement expenditures, the United States and its allies maintain a favorable balance of maritime power. During the past 25 years, however, the Soviet Navy has conducted a significant, sustained modernization program that has steadily improved its combat capabilities.One of the dramatic military developments since the early 1960's has been the appearance of the Soviet Navy on the world's oceans.Previously, the Soviet fleet spent virtually all its time in port or in home waters, its open ocean capability sharply limited by poor training. Although Soviet naval activity has increased markedly since then, we remain confident of the qualitative superiority of the U.S. and NATO fleets in training and materiel readiness for war.

Figure IV-3 compares major surface combatant inventory value of the U.S. and USSR. It shows that the inventory value of Soviet major surface combatants has steadily increased for the past 20 years as a result of their persistent, sustained program. Figure IV-4 compares the inventory value of attack submarines. It shows that the higher production rate of Soviet submarines has resulted in a steadily increased force of substantially greater inventory value than the U.S.

In the past three years, three new classes of nuclear-powered attack

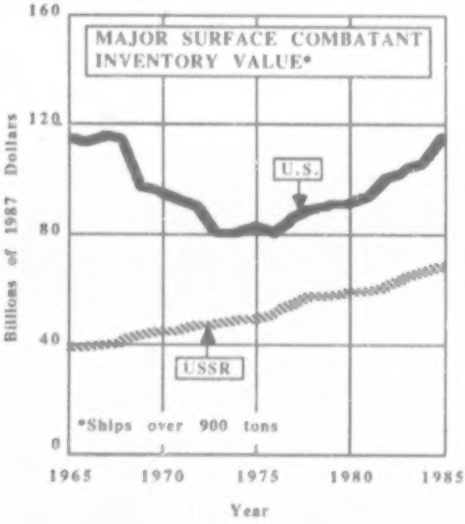


Figure IV-3. U.S. and USSR Major Surface Combatant Inventory Value, 1965-1985

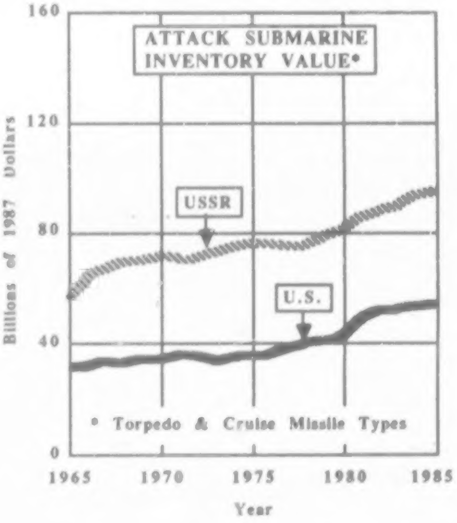


Figure IV-4. U.S. and USSR Attack Submarine Inventory Value, 1965-1985

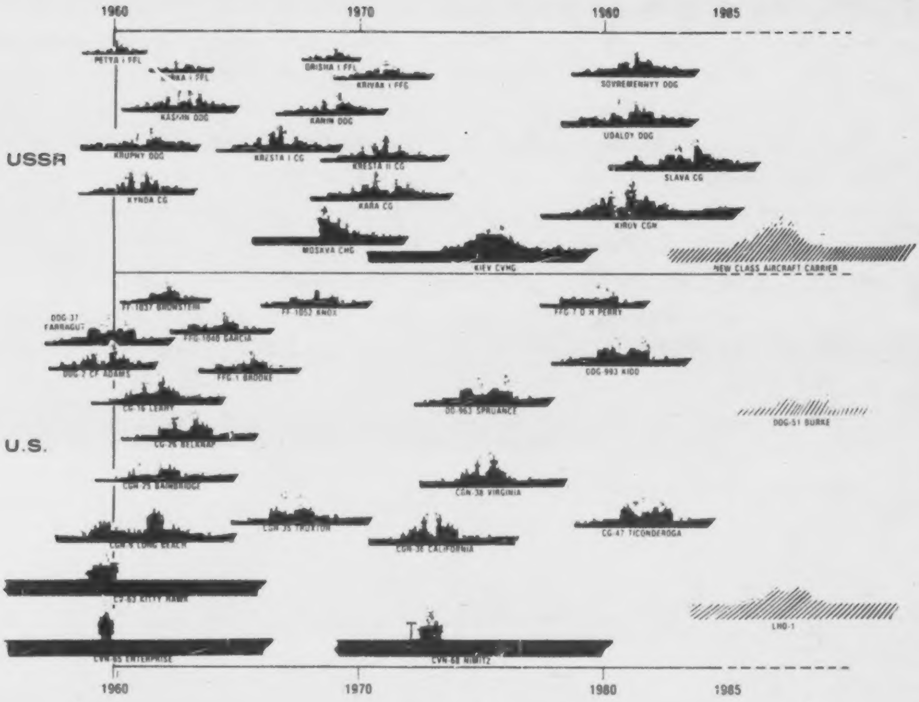


Figure IV-5. New U.S. and USSR Major Surface Combatant Classes, by IOC Date, 1960-1965

submarines were launched by the Soviets--MIKE, SIERRA, and AKULA. The diversity of the Soviet submarine force is complemented by continuing production of the diesel-powered KILO class attack submarine.

Figures IV-5 and IV-6 provide an illustration of representative naval warfare acquisition efforts of the U.S. and USSR since 1960.

Construction of a large aircraft carrier (65,000 tons displacement) by the Soviets continues. As described last year, completion is expected before the end of the decade. The second nuclear-powered guided missile cruiser,

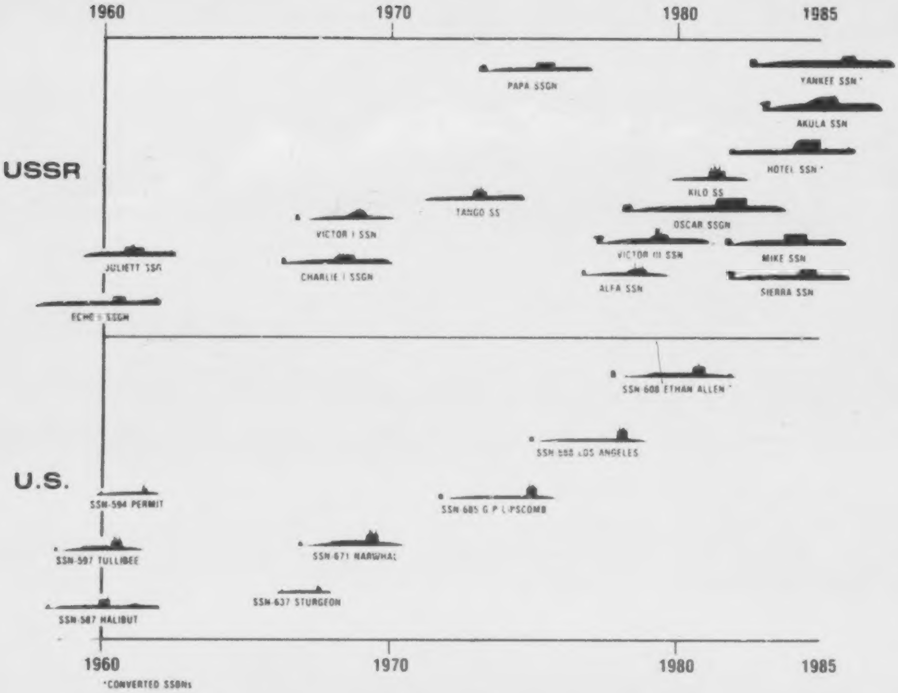


Figure IV-6. New U.S. and USSR General Purpose Submarine Classes by IOC Date, 1960-1965

FRUNZE, has joined the Fleet, and a third ship of the class continues under construction on building ways in Leningrad.

Table IV-3 provides a qualitative summary of naval modernization efforts on both sides.

The Soviet modernization effort extends across a broad front and includes:

- improved sea based tactical air capability when the large new aircraft carrier goes to sea;
- expansion of the anti-air and anti-missile defense capability of surface task groups (the SLAVA, FRUNZE and KIROV guided missile cruisers, for example); and

Table IV-3. U.S./USSR Naval Warfare Modernization Programs

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
Major Surface Combatants			
CG-47 Aegis Cruiser	• Quick reaction • High firepower • Improved ECM assistance in AAW	New Class Aircraft Carrier	• Possible capability to launch and recover high performance tactical aircraft
DDG-51 Guided Missile Destroyer	• Quick reaction • Multi-mission • Operates offensively and defensively	Kirov CGN	• Nuclear powered • Increased offensive (long- range anti-ship) and improved (area) defensive (anti-air/anti-cruise missile) firepower
LHD-1 Amphibious Ship	• Adds stand-off amphibious capability	Slava CGN	• Increased offensive power as above
		Udaloy DDG	• Advanced air defense and ASW systems
		Sovremennyy DDG	• Advanced air defense and naval gunfire capabilities
Submarines			
		Mike-class SSN	• Increased size • Advanced hull and propulsion technology • Torpedo tube launched cruise and ASW missiles
		Sierra-class SSN	• Significant quieting • Improved sensors • Torpedo tube launched cruise and ASW missiles
		Akula-Class SSN	• Improved sensors • Torpedo tube launched cruise and ASW missiles
Anti-Submarine Helicopters			
Lamps Mk III ASW System	• Expanded ASW Capability	Ka-27 (Helix) ASW	• Advanced airframe and ASW systems technology
Missiles and Torpedoes			
Sea Level ASW Stand-Off Weapon	• Improved stand-off ASW capability	SS-N-22 Anti-Ship Missile	• Increased speed (Supersonic) and low altitude penetration capability • Improved ECCM
Rolling Air Frame Missile	• Improved cruise missile defense	Torpedo	• Increased size • Increased range • Increased speed • Improved warhead
Mark 50 Torpedo	• Improved speed and endurance		
Mark 48 Adcap	• Improved speed depth and homing capability		

- intensification of the open-ocean capability of Soviet submarines (the MIKE, SIERRA, and AKULA class SSNs) and their transition toward multi-purpose forces through installation of torpedo tube-launched ASW and land-attack cruise missiles.

In response to the increasing combat capability of Soviet naval forces, the more noteworthy developments in current U.S. acquisition programs are aimed at improving our anti-missile capabilities (through the CG-47 AEGIS cruiser and DDG-51 guided-missile destroyer programs) and improvements in ASW and land-attack cruise missiles capabilities (through the SSN-21 class submarine, the LAMPS ASW helicopter, maintaining our highly leveraged advantage in attack submarine apabilities and improved ASW missiles and torpedoes). The SSN-21 program is critical to maintaining our highly leveraged advantage in attack submarine capabilities. During FY 1987, we will be producing the detailed drawings and supporting documentation needed to begin construction of the ship.

The magnitude of the Soviet shipbuilding program is shown in Table IV-4. They are producing about the same number of major surface combatants as the U.S., although they do not have the sea lane defense requirements of the U.S. Navy.

Figure IV-7 points to one of the factors that drives force acquisition: age. It shows the number of U.S. and Soviet major surface combatants and general purpose submarines that are already more than 20 years old and are candidates for replacement, due simply to wear and tear, without regard to technological sophistication. The problem of an aging block of ships, all built within a few years of each other, was one that the U.S. faced in the late 1960's and early 1970's. The Soviets are now facing a similar problem in terms of fractions of existing forces coming up for replacement. The implications are several: Procurement budgets will likely be stressed, and difficult force level decisions will have to be made. But perhaps more importantly, the need for force acquisition creates the opportunity, on both sides, for the enhancement of force leverage through application of advanced technology to the acquired forces. Because of this opportunity for application of advanced technology available to the Soviets, we must commit ourselves to a continuous effort of force leverage enhancement through superior technology and to constraining technology transfer to the Soviet Bloc.

Table IV-4. Production Summary of Naval Vessels for NATO and Warsaw Pact Forces, 1976-1985

Category	1976-1985 10-Year Total				1985				10-Year Trend	
	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR
Major Surface Combatants	90	85	192	110	8	8	16	13	—	—
Amphibious Ships	7	21	9	32	2	2	2	2	↑	—
Attack Submarines	33	66	62	66	3	6	5	6	—	—

The Soviets have elected not to develop a large underway replenishment ship force for an offensive surface role in the open oceans against major opposition, and their surface combatant force includes only a few ships (KIROV and SLAVA classes) with the new SA-N-6 anti-air area defense system. Thus, we continue to regard the attack submarine force and the long-range, missile-armed, land-based bomber force as the principal threats to U.S. maritime forces.

Three important initiatives to our naval warfare mission area have been undertaken to improve overall maritime force capability. First, concern for the defense of our overseas bases, forward-deployed battle groups, and sea lanes against air and surface threats has led us to examine our ability to detect and track these threats over oceans and littorals vital to our maritime interests. Our evaluation shows that, to fulfill our defense goals, we need surveillance sensors that can cover broad areas nearly simultaneously. Because such broad surveillance involves forces and systems that are multi-Service and multi-national, DoD oversees the effort through the Maritime Anti-air Warfare Executive Committee (MAAWEC) co-chaired by the Under Secretary of Defense for Research and Engineering and the Director, Program Analysis and Evaluation. The MAAWEC has made recommendations to achieve the best balance among maritime surveillance programs such as Over-the-Horizon Radars (OTHRs), conventional line-of-sight microwave radars, and spaced-based assets. Important joint initiatives with several Allies have been undertaken and are well on the way to implementation.

The second initiative concerns the broader area of maritime anti-air

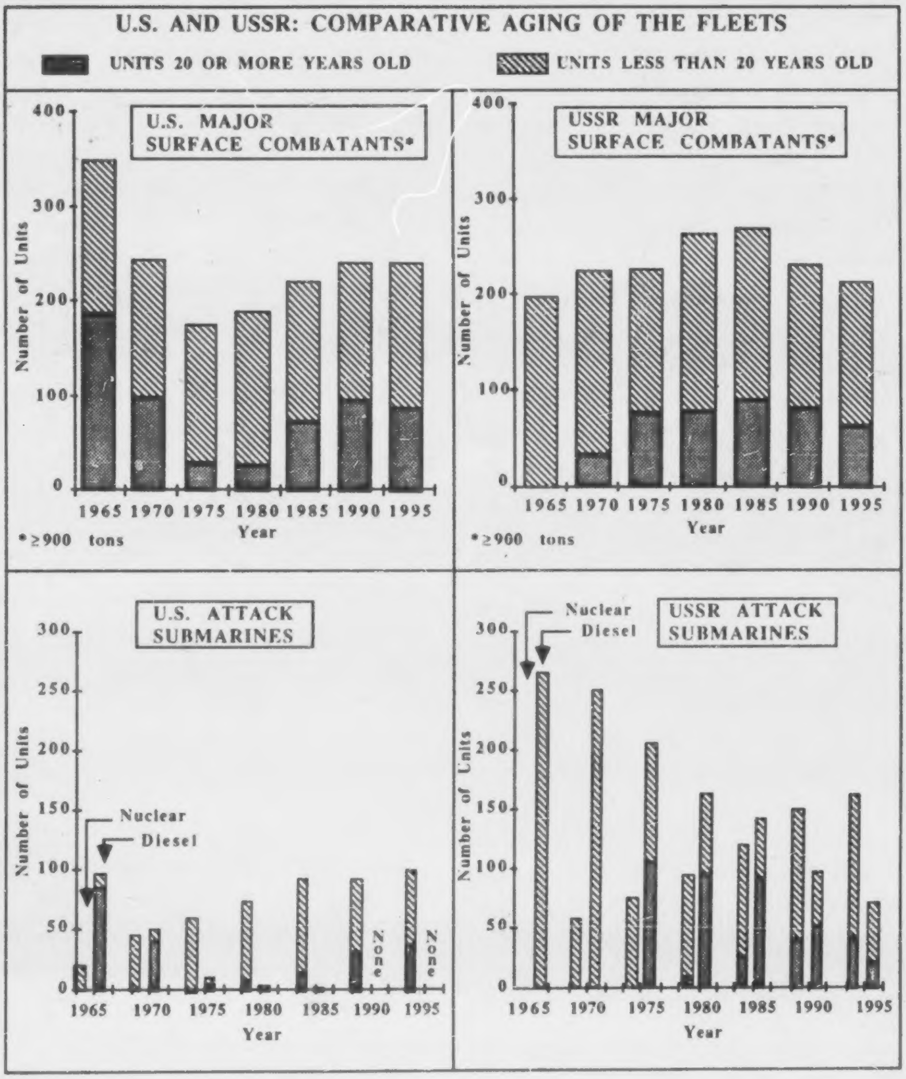


Figure IV-7. Age of The Fleets--U.S. and Soviet Major Surface Combatants and Submarines, 1965-1995

warfare investment planning. The MAAWEC proposed an investment strategy that encompasses both land- and sea-based forces in broad maritime regions, such as the Norwegian Sea Mediterranean, and Northwest Pacific. The Committee has recommended a general plan for the development of naval surface-to-air missiles that was presented to Congress by the Secretary of Defense in early 1984, and has followed up to assure execution of that plan. In concert with the Services and the Unified and Specified Commands, the Group has outlined the significant elements of a broad strategy for regional maritime air defense and has been working to convey it throughout the Navy and Air Force.

The third initiative concerns identification of advanced programs and technologies that will become necessary for successful Anti-Submarine Warfare (ASW) against the improving Soviet threat. The previously mentioned SSN-21 is a critical part of the answer, but the problem is much broader.

AIR WARFARE

The across-the board qualitative and quantitative improvements that have taken place in the other branches of the Soviet armed forces during the past two and one-half decades are strikingly evident in the category of tactical air warfare. Figure IV-8 depicts different types of fixed-wing aircraft introduced by the U.S. and the Soviet Union during this period.

The Soviet Union has introduced more different aircraft types during this period. Of greater significance, however, is the major qualitative advances represented by the introduction of FULCRUM-A/FLANKER-B/FOXHOUND. While the U.S. maintains a technological lead, its magnitude has been reduced by the increased levels of sophistication and capability incorporated in newer Soviet aircraft. This increased capability includes advanced air-to-air radars and missiles providing all-weather, all aspect, look-down/shoot-down capabilities on their interceptors and increased range/payload capabilities on their attack aircraft.

Additionally, a summary of tactical aircraft produced from 1976 to 1985 shows that the Soviet Union has outproduced the U.S. by a factor of over two. NATO production also lags that of the Warsaw Pact (Table IV-5).

Because the Soviet Union procures more aircraft than the U.S., and because the newer systems are increasingly more sophisticated and capable than past models, Soviet aircraft inventory

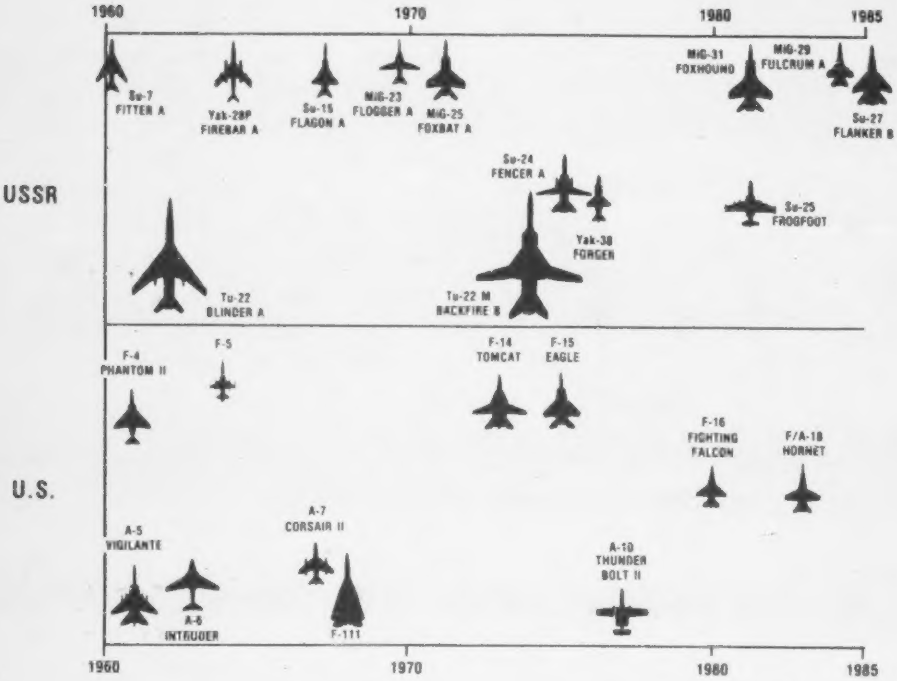


Figure IV-8. New U.S. and USSR Strategic Interceptors, Theater Bombers, Tactical Fighters and Attack Aircraft by IOC Date, 1960-1985

Table IV-5. Production Summary of Selected Tactical Aircraft for NATO and Warsaw Pact Forces, 1976-1985

Category	1976-1985 Annual Average				1985				10-Year Trend	
	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR	NATO	Warsaw Pact	U.S.	USSR
Fixed-Wing Combat*	360	790	720	895	320	700	740	750	—	—
Rotary Wing										
Attack Helicopters	45	205	105	220	50	250	100	250	—	↑
Other Military Helicopters	110	330	375	370	185	300	335	325	↑	—

*Includes strategic defense interceptors and ASW aircraft.

value has increased much faster and is estimated to have exceeded that of the U.S. during the past decade (Figure IV-9).

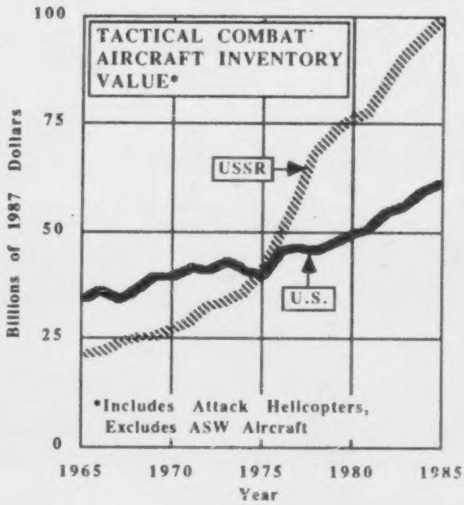


Figure IV-9. U.S. and USSR Tactical Combat Aircraft Inventory Value, 1965-1985

These trends are a matter of concern since tactical air is an area in which it is essential that we maintain the advantage. As a means of maintaining the technological advantages the U.S. depends on to counter the Soviet numerical superiority, we are aggressively pursuing programs both to enhance the capabilities of current front-line tactical aircraft/weapons and to develop new aircraft/systems/weapons.

In the near-term for our Counter-Air mission area, we must be able to defeat the increased threat represented by the introduction of current generation aircraft and missiles. With regard to our current front-line aircraft, we have undertaken a series of carefully planned Multi-Stage Improvement Progams (MSIP) and block upgrades. Qualitative trends are shown in Table IV-6 and succeeding paragraphs provide amplifying details.

The first F-15E aircraft will be delivered to the USAF in FY87. F-15E retains the basic air superiority capability of the F-15 multi-stage improvement aircraft and adds significant air-to-ground capability. The aircraft will be capable of long-range interdiction missions with its improved range/payload and low-altitude, all-weather capabilities. Many of the improvements to the F-15E weapons system have evolved from the development of other aircraft, in particular the F/A-18. This evolutionary development of advanced systems' capabilities has a high leverage effect and is a recurrent theme in recent research and development efforts with standardized computer languages, data transfer bases and common hardware directed where applicable.

Table IV-6. U.S./USSR Aircraft Modernization Programs

U.S.		USSR	
System	Qualitative Trends	System	Qualitative Trends
Fixed-Wing Combat Aircraft			
F-15E	• Enhanced air-to-air capability • Significant air-to-ground capability	Su-27 (Flanker B)	• Look-down/shoot-down fighters; improved air combat agility
F-16 MSIP	• Software and avionics upgrades for increased air-to-air and air-to- ground capabilities	MiG-29 (Fulcrum A)	• Possible ground attack role
		MiG-31 (Foxhound)*	• Improved capability to engage low altitude aircraft and cruise missiles
F/A-18 Hornet	• Increased weapons load • Operational flexibility		
F-14A upgrade/ F-14D	• Upgraded avionics • Increased reliability • Standardized digital hardware/software • Higher performance engine		
EF-111A Tactical Jamming Aircraft	• Provides electronic countermeasures (ECM) protection to tactical aircraft		
Helicopters			
AH-64A Apache Attack	• Improved speed and agility • Night and all weather capability • Target detection/designation capability • Advanced avionics and armament	Mi-26 (Halo)	• Heavy payload, long range
		Mi-28 (Havoc)	• Increased speed, agility, night and all weather capability
		Hokum A	• Fighter helicopter with air-to-air capability (world's first)
OH-58D AHIP (Army Helicopter Improvement Program)	• Improved Nap-of-the-earth (NOE) navigation and communications • Day, night and adverse weather operations world wide • Provision for air-to-air Stinger • Enhanced vision equipment for target acquisition and designation		

*Also included in strategic defense modernization comparison in Chapter III.

The F-16 MSIP continues to advance the capabilities of the aircraft's air-to-air and air-to-ground capabilities as software and advanced avionics systems develop. In particular, state-of-the-art cockpit displays, .electronic warfare suites and a Beyond-Visual-Range (BVR) missile capability are being incorporated to make the aircraft all-weather operable. Long-term procurement plans indicate that the F-16 will continue to be a major portion of the USAF force structure as well as an important part of many other free world countries.

The F/A-18 has completed its first operational deployment with documented readiness and maintainability that exceeded its expectations. The inherent flexibility of the Navy's first true strike-fighter has provided Battle Group Commanders with operational options and flexibility never before possible. Early design that placed heavy emphasis on operability, reliability, and maintainability have made the F/A-18 the new standard for readiness and are being applied to advanced programs for follow-on aircraft.

The F-14 is being upgraded by production/retrofit of the F-14A, which features a new engine and improved ECM. An additional improvement is the F-14D which incorporates upgraded F-14A advances and adds an improved radar and upgraded avionics. The upgraded F-14A and F-14D will begin production in FY86 and FY88 respectively.

Across the board, aircraft operational readiness and sustainability goals are being maintained at unprecedented levels through a combination of state-of-the-art fault analysis systems and maintenance techniques, flexible test support equipment and adequately stocked spares support. Recent history has shown large payoffs from our investments in these areas and we intend to continue those upfront investments.

Engine improvements represent an important part of our fighter upgrade program. Near term emphasis has been on enhanced reliability, supportability, and readiness as well as increased aircraft maneuver capability. Qualification of the F100-PW-220 and F110-GE-100 engines has been completed and introduction into F-15 and F-16 aircraft squadrons will soon begin. A varient of the F110-GE-100 engine will go into the upgraded F-14A and F-14D aircraft. Efforts are underway to develop/qualify increased performance versions of these engines as well as the F404-GE-400 engine in the

F/A-18. In the longer term, the Joint Advanced Fighter Engine (JAFE) entered the demonstration/validation phase of development in FY85 and will enter Full Scale Development in FY89.

Important complements to the aircraft are improved combat identification systems, automated command and control systems for airspace management and improved airborne surveillance and control capability. Production of upgraded Sidewinder, Sparrow, and Phoenix missiles continues. Current versions of these missiles feature improved reliability, Counter-Countermeasure (CCM) capability and ground clutter resolution. The Advanced Medium Range Air-to-Air Missile (AMRAAM) is the next generation missile being developed for the Air Force, Navy, and our NATO allies. AMRAAM will provide increased velocity, better maneuverability, a more lethal warhead, improved terminal guidance, multiple launch/launch-and-maneuver capabilities and improved CCM. The missile, which entered flight test during the past year, will be an effective force multiplier when it is introduced to operational forces in 1989.

To counter anticipated introduction of future Soviet advanced tactical aircraft, development has begun on the Advanced Tactical Fighter (ATF). This aircraft, which will begin replacing the F-15A in the mid-1990's, will fulfill the requirements for greater combat radius, more rapid deployment capability, reduced logistics support and improved survivability. These requirements will be met through incorporation of advanced integrated avionics architectures, Very High Speed Integrated Circuit (VHSIC) technology, digital flight controls, aerodynamic refinements and other advanced technology developments. Improved reliability and maintainability are priority goals. Selection of three or four contractor teams will occur in FY86. These teams will demonstrate/validate respective ATF concepts through detailed design analysis, mission effectiveness testing and wind tunnel testing. The Demonstration/Validation phase, continuing through FY89, will place heavy emphasis on risk-reduction efforts on key ATF technologies and lead to selection of a single design in FY89.

Suppression of Enemy Air Defense (SEAD) is a priority mission in carrying out the objectives of the TACAIR attack missions. The Soviet Union has an integrated system of surface-to-air missiles (SAMs) and Anti-Aircraft Artillery (AAA) that is the most comprehensive network of ground air defense in the world. Over 4600 SAM launchers and 12,000 AAA pieces are deployed at regimental through front-level. As many as 25,000 shoulder-fired SAM launchers are at lower levels. The largest concentration of SAM launchers and AAA pieces--over 8,000--is found opposite NATO. In addition, there are 4500 in the Far East, over 2500 in Southwest Asia and opposite Eastern Turkey, and over 1600 in strategic reserves. As many as 25,000 shoulder-fired SAMs are also deployed with the Soviet Ground Forces. Soviet production of surface-to-air missiles continues at a rate of about 55,000 per year. This compares to about 5,000 for the United States. Figure IV-10 shows the extent of the USSR land-based SAMs in relation to the U.S. missiles. Sea targets are defended by gun systems and SAMs that are ship-launched versions of the land-based SAMs shown in Figure IV-

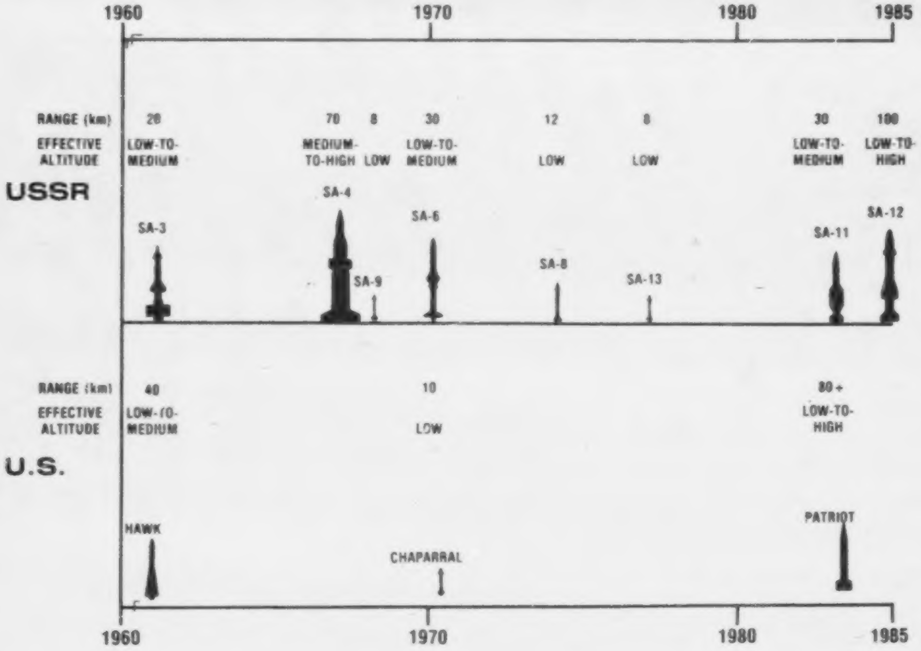


Figure IV-10. New U.S. and USSR Tactical Land Based SAMS, by IOC Date, 1960-1985

10. As previously mentioned, both ROLAND and RAPIER are foreign missiles which are used to defend U.S. Air Bases in Europe and are not included in Figure IV-10.

We are acquiring the Precision Location Strike System (PLSS) which can locate air defense emitters in near real-time, and provide this information for targeting standoff weapons. It will enhance the effectiveness of the EF-111 jamming aircraft and F-4G Wild Weasel by cuing them to their targets.

The EF-111 Raven provides tactical jamming of early warning, acquisition, and ground control intercept radars in support of United States and allied tactical strike operations. It denies enemy command and control centers the necessary range, azimuth, and altitude information needed to cue interceptors, surface-to-air missiles and anti-aircraft artillery. To counter Soviet advances, updates are in development closely coordinated with the Navy EA-6B update effort to avoid duplication and provide synergistic results for both programs.

The F-4G Wild Weasel can automatically detect, locate, engage, and destroy hostile radars. The APR-38 Radar Warning and Attack System is the backbone of the F-4G. We are upgading this mid-1970's design by increasing the capacity of the on-board computer, increasing receiver frequency range, and increasing system processing speed. These updates will allow the Wild Weasel aircraft to fully exploit the capabilities of the High Speed Anti-Radiation Missile (HARM).

The HARM provides a destructive counter to sophisticated enemy ground-based radar guided missile systems, and anti-aircraft artillery systems which threaten our tactical aircraft. Production of HARM is continuing at increased and more efficient rates. Software updates are being developed to counter steadily improving threats. In addition, the HARM low cost anti-radiation seeker development continues with potential application in various missile configurations.

In the GBU-15/AGM-130 program, a family of modular guided weapons is being developed to destroy high value point targets and enemy defense sites. The GBU-15 is a glide bomb equipped with a Television (TV) or Imaging Infrared (IIR) seeker. The AGM-130 is a rocket-powered version of the GBU-15. A highly accurate medium-standoff weapon, the AGM-130 responds to the improving enemy air defense systems by moving the attacking aircraft further from the target. The GBU-15/TV version is in production and will be used by F-4E, F-15E and F-111F aircraft. The GBU-15/IIR version is in final testing and will provide a night attack capability. AGM-130 development began last year and early testing will begin during FY 1986. It will also be carried by the F-15E, the F-4E, and F-111F.

The Close Air Support (CAS) Mission is usually conducted when friendly ground forces are immediately threatened by superior opposing ground forces. CAS forces must be capable of defeating a variety of targets that include tanks, armored personnel carriers, artillery, other armored vehicles, and air defenses. Often the mission must be conducted when enemy ground forces are well defended by air defenses making multiple passes hazardous. The Warsaw Pact (WP) has continued to stress highly mobile, well-defended mechanized forces. Warsaw Pact modernization efforts include countermeasures against our CAS capabilities such as the use of obscurants, increased vehicle protection (passive and reactive armor) and improved tactics for day/night operations.

To increase our weapon effectiveness under a wide range of lighting conditions, we are fielding infrared weapons such as the day/night capable IIR MAVERICK, and laser MAVERICK for use on the AV-8B, A-10, and other air platforms. We are also procuring the proven 30mm gun pods for use by A-7's and F-4's in the Air National Guard (ANG). To obtain high sortie effectiveness, we are developing the tri-Service hypervelocity missile which promises to provide multiple-kills-per-pass for fixed wing and rotary wing aircraft.

For attack of enemy airfields we are developing standoff weapons including the AGM-130 as well as short range, low cost systems such as the Direct Airfield Attack Combined Munition (DAACM) to complement DURANDAL. In the past four years, we have introduced to production and in the inventory the IIR GBU-15, LLLGB, and advanced capability MAVERICKS. Each weapon possesses unique, complementary capability against a spectrum of tough, hard targets. A summary of our aircraft weapon modernization efforts is provided in Table IV-7.

The Air Force has accelerated its efforts to develop a Hardened Target Munition (HTM) for use against the expanding array of hard land targets. This munition is being developed for use with developmental standoff weapons and initially will be compatible with

Table IV-7. U.S. Air-Launched Weapons Modernization Programs

MISSILE SYSTEM	IMPROVEMENTS
AIR-TO-SURFACE	
JTACMS	– Long standoff range, day/night operation, high effectiveness. – Multiple payload.
GBU-15	– IIR seeker for day and night operation.
Powered GBU-15 (AGM-130)	– Increased standoff for improved aircraft survivability. – Submunition and unitary payload for increased effectiveness and flexibility.
MAVERICK	– Effective Anti-Armor missile for fixed wing aircraft. – Laser and IIR for day and night operation.
HELLFIRE	– Effective Anti-Armor missile for helicopters. – Laser guidance for precision and control.
HARPOON	– Improve reliability. – ECCM upgrade.
WALLEYE ER/HDL	– Improved standoff range. – Minimize susceptibility to countermeasures.
SKIPPER	– Powered laser guided bomb for standoff anti-ship. – Low cost compliment to Harpoon.
DURANDAL	– Effective airfield runway buster.
DAACM	– Efficient airfield attack munition.
SFW/SKEET	– Multiple armor kills per pass. – Superior Cost/Effectiveness cluster munition.
GATOR Mine	– State-of-Art anti-armor, airfield mine.
LLLGB	– Increased accuracy and low-level capability
HARM	– All-weather missile to destroy enemy radar – Broad-band frequency coverage.
AIR-TO-AIR	
SIDEWINDER	– Improved infrared CCM – Improved clutter rejection
SPARROW	– All aspect/all weather attack – Improved look down/shoot down
AMRAAM	– Multiple engagements against ECM – Improved speed and agility
PHOENIX	– All aspect/all weather attack against multiple targets – Broad ECCM capabilities

current laser guided weapons kits. The Air Force JTACMS, which has completed system definition, will provide the versatility to accomplish many of the strike missions with different warheads.

To help our tactical aircraft deliver these new weapons more effectively, we are developing advanced sensors to enhance navigation, target acquisition, weapon delivery, and overall survivability. The two pod LANTIRN system is programmed for Air Force F-15E and F-16C aircraft. The navigation pod entered production this past year and will permit highly survivable, low level, high speed penetration at night. The targeting pod is completing testing and will enter production with a decision scheduled for May 1986.

The Navy is upgrading the A-6 aircraft with a more reliable avionics digital system with many components standardized across the AV-8B, F/A-18, F-14, and A-6 fleets. To enhance survivability, the new precision attack radar of the A-6 will permit robust operation in an ECM environment as well as provide resolution and identification of ship targets for first pass attack with standoff weapons. The Navy will also extend the night capability of the AV-8B, A-6, and F/A-18 by developing a combination of night vision goggles and wide-field-of-view infrared imaging sensors.

The Navy has hardened the WALLEYE data link for effective operation in the high threat environment, as well as deployed the extended range WALLEYE I. The Navy's laser guided SKIPPER has been outfitted to all deployed carrier air wings. Its low cost, moderate standoff capability makes it effective against the smaller, less defended ships and provides a good compliment to the radar guided HARPOON, our long range anti-ship weapon.

The Navy is also investigating a new strike weapon, as part of its Conventional Strike Weapons Plan, which will have precision guidance, good standoff range and be widely deployed in the fleet. These strike systems are expected to result in much increased launch platform survivability and enable us to operate effectively in the high threat environment.

CONVENTIONAL MUNITIONS

The preceding discussions on the Tactical Warfare mission areas have made numerous references to our initiatives in conventional munitions. This section summarizes our recent increased emphasis on acquiring modern, conventional munitions. Our acquisition strategies for conventional munitions are heavily threat-oriented. While most of the munitions are intended for multi-mission application, the defeat of a specific target class typically drives the design. This statement is particularly true with respect to our anti-armor munitions. In this regard, anti-armor munitions are very demanding in that a large amount of impact energy must be delivered to the target with a high degree of accuracy.

During the first half of this decade, we have made considerable progress in increasing the quality and quantity of conventional munitions (Figure IV-11). Each bar shows the sum of gun-launched munitions and missiles expressed in constant FY86 dollars. During the period following the Vietnam draw-down, the munitions accounts were fairly constant. Starting in FY83 there is a significant upward trend in the munitions accounts. Both types of munitions show significant increases in the four year period between FY83 and FY86. The largest percentage increase occurs with missiles.

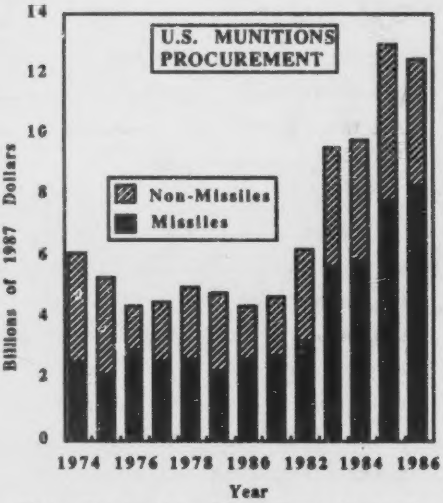


Figure IV-11. Munitions Procurement, 1974-1986

Current emphasis on conventional munitions is centered on applying the technology of recent advances in electronic components and computer processing into advanced seekers, sensors, and fuzes. These, coupled with new warhead technologies, form the basis for the DoD thrust in smart munitions. As the DoD Budget demonstrates, we have made a considerable R&D commitment to development of smart munitions such as the Air Force's Sensor Fuzed Weapon (SFW) and the Army's SADARM and Smart Target Activated Fire and Forget (STAFF). These munitions utilize advanced directional fuze concepts and Explosively Formed Penetrator (EFP) warheads. They are not guided munitions and, therefore, are expected to be much less costly than terminally guided munitions. By effectively managing the assignment of the smart munitions to be employed against the different targets, it is possible to further optimize the force multiplier effect of a given stockpile of modern munitions. All three Services are working on the battle management task.

From a cost effectiveness standpoint, it would be highly desirable to replace the existing stockpile of conventional munitions with new modern munitions. This is not affordable since our current investment in the stockpile is in excess of $30B. The affordable solution is to utilize our new modern munitions in such a way as to allow an early transition to the standard stockpile. This solution envisions massive applications of modern munitions during the early days of a conventional conflict. These munitions would be targeted against those enemy targets that pose the greatest threat to the survivability of our delivery systems and maneuver units. By effectively drawing down on these enemy assets, we should be able to transition to employment of the standard stockpile. Figure IV-12 graphically depicts this concept.

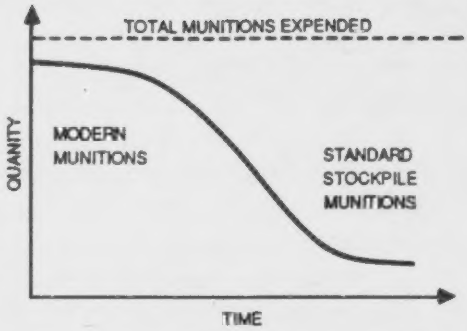


Figure IV-12. Effective Utilization of Munitions Stockpile

The Deputy Secretary directed the formation of the Munitions Council chaired by the USDRE, and we have established the Office of Munitions. The objective in both cases is to focus the munitions efforts of the Military Departments with the near term goal of improving the mix of conventional munitions available to our operational commands. A noteworthy accomplishment of the Munitions Council included a significant increase in the Services' procurement accounts. The majority of these funds were directed toward increased inventories of precision guided munitions such as the HELLFIRE, TOW 2, and Chaparral. In this regard, the Defense Guidance has been amended to better focus on U.S. warfighting capability. The thrust is now one of "Win Early" rather than sustainment alone with our stockpiles.

A recent DSB Task Force, charged with examining the acquisition process for conventional munitions, concluded that the munitions acquisition process can be materially improved and that larger inventories of modern munitions can greatly improve our warfighting capability. The Task Force recommended specific steps to improve the acquisition process. Among these are that management oversight should be based on: stockpile and target oriented master plans; an improved, matched set of analytical models to support program decisions at all stages; a strong Munitions Council with a supporting staff in the Office of Munitions and, means to independently assess munition producibility throughout development. Also, the full-scale development process should be tailored to the special needs of high-technology, high-quantity requirements, and better feasibility demonstrations, long-life evolutionary programs with regularized product improvement plans, and more emphasis on competition and producibility. Our technical base, financial resources, organization, and personnel need strengthening. Conventional munitions technical base funding must be improved--with particular attention to 6.3A feasibilty demonstration programs.

As a result of congressional guidance, a coordinated Anti-Armor Munitions Master Plan has been prepared. This plan is updated annually to help us better manage this important class of munitions. It is our intention to develop a number of target oriented master plans under the umbrella of an overall Conventional Munitions Master Plan. These plans will be used as a means to guide our conventional munitions thrust. The plans will also assist us in articulating this thrust to the Congress.

MOBILITY

Department of Defense mobility capabilities continue to improve to meet our worldwide commitments. The primary mobility mission is to deliver combat and support forces in a timely manner as close as praticable to intended areas of operation and then sustain these forces with resupply. Timely deployments can deter and defend against Soviet bloc aggression in critical theaters such as Southwest Asia, NATO, and Korea. For most potential areas of conflict, the U.S. has the disadvantage, vis-a-vis the bloc, of much greater distances to deliver and resupply forces; this constitutes the driving factor in designing our mobility assets (airlift, sealift, prepositioning, and supporting elements). Soviet airlift and sealift continue to expand for potential operations in more remote theaters. A prime example is the new Condor AN-124 transport (sometimes called a "C-5ski" due to its resemblance) and the continued expansion of Soviet sealift. Table IV-8 compares some current U.S. and Soviet mobility modernization efforts. Progress continues to be made in quantifying our mobility needs--e.g., the completed Ready Reserve Force / Container-Mod Ship Sizing and DoD Sealift Tanker studies and the ongoing Worldwide Intratheater Mobility, Operational Support Airlift Wartime Requirements, and Material Handling Equipment studies.

In airlift, we are in final phases of procuring additional C-5Bs, KC-10As (which also provide air refueling capability), and Civil Reserve Air Fleet enhancement. The cornerstone of our airlift modernization effort is the C-17A. Full-Scale engineering development was approved in 1985, extensive wind tunnel testing of scale models, full-scale ground tests of the turbofan engine, and comprehensive loading and compatiblity demonstrations with Army equipment/personnel have been conducted. First flight is scheduled in FY 1990 with initial operational capability planned for FY 1992. The C-17A, while providing the final increment in achieving our long-term intertheater airlift goal, will also have the flexibility to augment the C-130 tactical airlift fleet, providing a first-ever intratheater outsize capability.

Table IV-8. U.S./USSR Mobility Modernization Programs

U.S.		USSR	
Mission Area/ System	**Qualitative Trends**	**Mission Area/ System**	**Qualitative Trends**
KC-135 Tanker Conversions	• Improved fuel offload	IL-76 (Candid) Tanker	• Improved in-flight refueling, comparable to unconverted KC-135As
KC-10A Tanker/ Transport	• Very high fuel offload • Can refuel and carry maintenance equipment for deploying fighters		
C-5B Transport	• Expanded force projection • Outsized cargo capability	AN-124 (Condor) Transport	• Somewhat larger but generally comparable to C-5
		AN-72 (Coaler) Transport	• Configuration similar to much larger U.S. YC-14 Short Take-off and Landing (STOL) transport
Fast Sealift Ship Conversions	• Very fast/very large roll-off ships for rapid loading/ transit/unloading	Roll-on/Roll-off ships	• Moderate to fast ships for rapid loading/unloading

Demonstrations have been conducted to determine the feasibility of increased C-5 performance in the areas of ground backing, heavier takeoff gross weight, and heavier in-flight gross weights. Detailed demonstration data are being analyzed to define any increased capability for the C-5 and the limits of conditions under which they may be used. The V-22 Osprey program (previously JVX) is approaching Full Scale Development. First flight is scheduled for February 1988 to meet the multi-mission role of amphibious assault for the Marine Corps, combat search and rescue to the Navy, special operations for the Air Force, and assault support for the Army. First delivery is for the Marine Corps in 1991.

In sealift, our program for fast sealift ships (previously SL-7) will be completed in 1986. Programs for hospital and Marine Corps aviation logistic support ships and expansion of the Ready Reserve Force continue. Our Merchant Ship Naval Auxiliary RDT&E program is investigating ways to provide merchant ships with capabilities that make them militarily-useful in a crisis that requires increased surge sealift. The new Civil Reserve Auxilliary Fleet Ships (CRAFTS) program will provide military enhancements to newly built commercial sealift.

In prepositioning, the maritime prepositioning ship program will be completed in 1986. Army and Air Force prepositioning in Europe and Southwest Asia, and Marine Corps prepositioning in Norway continues.

In the critical area of cargo offload and discharge system (especially for over the beach operations), acquisition of a variety of equipment (e.g., crane ships, causeway systems and roll-on/roll-off discharge platforms) continues. Our RDT&E program is investigating the development of new and advanced systems--as well as the use of existing commercial systems--that will accommodate the use of modern commerical ships for transfer of cargoes off-shore to the beach. A heavy lift air cushion vehicle is under development by the Army for the ship-to-shore transport of outsize cargo, heavy lift equipment, vehicles, and containers. This vehicle, currently designated Lighter, Amphibian, Heavy Lift (LAMP-H), has a planned IOC in the early 1990's.

In airdrop, development continues on improving the capability (weight, altitude, speed, and accuracy) of delivering personnel and cargo for critical missions. C-17A cargo/troop compartment mockup tests have demonstrated its design for airdrop.

Considerable effort is being made in improving the command, control, and communications (C^3) that support mobility forces. The Joint Deployment System (JDS) development has produced a baseline that satisfies most of the information required by the Joint Deployment Community. Post-baseline enhancements and interface with Service unique systems are currently being addressed. The functions of the JDS will be incorporated into the Joint Operations Planning and Execution System with an IOC of FY 1990. The Transportation Coordinators' Automated Information for Movements System is being developed to provide source data to support deployment and the generation of timely and accurate movement information. Each military Service will establish the capability at unit bases with an IOC of FY 1990. Provision of improved sealift communications for merchant ships continues. For airlift, C^3 development continues in order to provide capability to rapidly and accurately exchange vital information between the Military Airlift Command ground elements and the aircraft. For secure, jam-resistant communications, a high frequency interoperability standard is being incorporated as part of the development to upgrade aircraft.

CHEMICAL WARFARE DETERRENCE

Goals

We must ensure that chemical weapons are never used against either the men and women of our Armed Forces or those of our allies.

We are therefore committed to a goal of re-establishing a credible military deterrent to chemical warfare. The following elements constitute our deterrent program:

- Obtaining a retaliatory capability in the form of safe, binary weapons.

- Providing our armed forces with the best chemical defensive equipment and training to permit sustained operations in a chemical/biological environment with special emphasis on reducing the difficult problems associated with working in that hostile environment.

- Expanding the ability of U.S. forces to treat casualties associated with nuclear, biological, chemical, and conventional weapons.

We are also developing an effective destruction program to rid ourselves of our existing lethal unitary weapons.

In accordance with our international treaty obligations, we will not possess or employ biological or toxin weapons, and we will use chemical weapons only in retaliation to the use of those weapons on our forces or those of our allies. We seek to eliminate the threat of chemical and biological warfare by achieving a complete and verifiable ban on chemical weapons and by seeking to strengthen existing agreements through verification and compliance provisions.

Major Achievements

With OSD acting as executive agency, the President's Chemical Warfare Review Commission concluded its review of the entire chemical warfare program and reported its findings in June of 1985. The major findings and recommendations centered on the adequacy of our current chemical munitions stockpile, the binary chemical modernization program and its influence on arms control, and the effectiveness of our defensive equipment measures.

The Commission concluded that our existing stockpile of lethal chemical munitions was not an adequate deterrent to the Soviet use of chemicals against us, citing the fact that the stockpile did not contain the kind of munitions required on the modern battlefield and the remaining munitions were old, deteriorating, and of little military value. It further recommended the accelerated destruction of this aging stockpile.

The Review Commission highlighted the value of our binary modernization effort as the portion of our program that would have the greatest influence toward achieving an effective arms control agreement while at the same time providing a credible deterrent to the use of chemicals in any conflict. In this regard, we are ready to produce the 155mm binary artillery shell and are vigorously continuing the development of the BIGEYE chemical bomb. BIGEYE development testing was completed in mid FY 1985 and the first phase of operational testing will be completed in early FY 1986. The second phase of operational evaluation is scheduled for late FY 1986 to be completed early in FY 1987. Longer range development programs are addressing some stand-off delivery systems.

The Commission noted that defensive measures alone were not sufficient to deter chemical warfare. However, they also noted the value of protective equipment to save lives and therefore preserve military capability.

To this end, our chemical defense technology efforts continue to expand and achieve substantial progress toward meeting the needs of our combat forces. Cooperative programs with universities, industry, and our allies are providing new detection and warning devices with improved sensitivities and portability. Advances in biotechnology have made possible protection breakthroughs in toxin detection mechanisms, prophylaxis, and casualty treatment. Decontamination systems are being fielded to enhance readiness and survivable collective protection systems are being procured to increase our sustainability in a chemical environment.

Current Objectives

The FY 1987 chemical warfare deterrence program allocates our budget in approximately the same proportion as previous years. Over 75% is allocated for defensive equipment needs. About 10% of the program funds continue to support our program to destroy the existing munitions stockpile. The remainder of the budget is for all of the areas relating to achieving a credible and effective retaliatory capability.

The Biological Weapons Convention comes up for review this year. In preparation for this review, we are assessing the national security impact of known and suspected Soviet agent capabilities.

V. COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C^3I)

C^3I GOALS/OBJECTIVES

Our national security policy of deterrence of war through the defensive use of military power relies on the ability to quickly react after an enemy has taken the first initiative. In order to carry out this policy, our C^3I systems must support command decision making with timely and accurate information and provide our commanders, at all echelons, the means to effectively employ their forces. Furthermore, we must be able to sustain these capabilities during both peacetime and periods of crisis.

Within the C^3I mission area, the primary goal is to provide the secure, survivable, endurable, and interoperable C^3I systems needed to maximize the performance of our forces and weapons systems. In pursuit of this goal, our overriding objectives are to: (l) build a more secure, survivable and enduring C^3I system capable of supporting the forces through any level of conflict; (2) correct emerging deficiencies in response to new threats and new mission needs; (3) improve existing C^3I assets by taking advantage of new technologies; (4) enhance the readiness of our strategic and tactical forces with upgrades in the areas of mobility, interoperability and sustainability; and, (5) strengthen our backbone multi-purpose communications networks. These objectives not only cover the development and acquisition of C^3I systems needed to carry out strategic and conventional missions in conjunction with our allies, but also the development of effective electronic combat and C^3 countermeasure systems for disrupting the enemy's C^3I capabilities.

MAJOR ACHIEVEMENTS

Strategic and Non-Strategic Nuclear Forces

The C^3I systems supporting the strategic and non-strategic nuclear forces are a critical element of deterrence. Considerable progress has been made in developing and acquiring the C3I systems needed for an integrated and effective nuclear force.

In order to improve communications and ensure connectivity between sensor sites, command locations, and nuclear capable forces, we are continuing to improve our strategic ground based, airborne relay, and satellite communications systems. A major objective planned for FY 1986 is the completed installation of the second phase (Thin Line Connectivity Capability) of the Ground Wave Emergency Network (GWEN). The GWEN is a dispersed network of radio relay stations and user terminals designed to provide assured communications connectivity to CONUS based nuclear forces. Communications connectivity with our submarine forces is also being improved, and an associated reduction in their susceptibility to detection is being realized with the implementation of the Extremely Low Frequency (ELF) communications system. The ELF system is expected to be fully operational in FY 1988. Also, fabrication of the prototype Take Charge and Move Out (TACAMO) replacement aircraft (E-6A) for the EC-130 is continuing with the contract award for the first two production aircraft expected in FY 1986. In the area of satellite communications, the Defense Satellite Communications System (DSCS III) and MILSTAR programs are continuing and will represent a significant enhancement in our ability to command and control our forces worldwide.

A number of improvements have been implemented, and further improvement efforts are underway in the attack warning/attack assessment area. We have initiated the procurement of additional PAVE PAWS radars to be operational in 1986 and 1987. In addition, we are currently upgrading the Thule Ballistic Missile Early Warning Stystem (BMEWS) radar and plan to initiate similar upgrades to the Fylingdales BMEWS radar in England during 1986. These upgrades will significantly enhance the quality and detail of missile warning information in the event of a nuclear attack by Intercontinental Ballistic Missiles (ICBMs) and/or Submarine Launched Ballistic Missiles (SLBMs). Also, replacement of the existing Distant Early Warning (DEW) Line, called the North Warning System, will result in a substantially improved capability to detect modern aircraft and cruise missiles across the entire North American boundary. The North Warning System, together with the new Over-the-Horizon Backscatter (OTH-B) radars, will provide complete contiguous surveillance coverage and timely warning of bomber or cruise missile attacks on North America.

We are also continuing to upgrade the capability and survivability of the command centers from which U.S. strategic forces would be directed during nuclear conflict. An example of our progress is the completed delivery of the four E-4B National Emergency Airborne Command Posts (NEACP). Delivery and fielding of NEACP is a considerable step forward in enhancing the survivability of the National Command Authorities (NCA) and, in turn, capacity for providing enduring strategic command and control.

Theater and Tactical C3

Theater and Tactical C3 focuses on the effective management and use of modern weapons systems on the tactical battlefield. Our efforts address not only service unique systems, but also joint service and allied capabilities.

A significant milestone was reached in our efforts to promote interoperability between the U.S. and our allies. NATO has endorsed an agreement on the operating parameters to be used in the NATO Identification System (NIS). The NIS is a NATO interoperable system for reliably distinguishing aircraft as friend or foe. Work is proceeding on defining the technical parameters of the system, and a test flight of the system is scheduled for 1987.

Major advances and milestones were also reached last year in the research, development and acquisition of specific equipment for improving theater and tactical C3 capabilities.

The Joint Tactical Information Distribution System (JTIDS) program is designed to provide a highly jam resistant, secure digital information system for use in a tactical combat environment. Delivery of the JTIDS Class I Ground Terminal is on-going, and a successful flight test of the JTIDS Class II terminal on an F-15 aircraft was conducted this past year.

Another joint effort, the Air Force and Marine Corps Modular Control Equipment/Tactical Air Operations Control (MCE/TAOC) program, will replace obsolete tactical air surveillance and control units. MCE/TAOC is undergoing field testing and production is scheduled to begin by late FY 1986.

The High Frequency (HF) Anti-Jam program is developing anti-jam HF communications systems to meet tactical support and strategic connectivity needs. Developmental testing has been conducted and a full-scale engineering development contract is planned for award during FY 1986.

With the delivery of the last Airborne Warning and Control System (AWACS) E-3A to NATO during 1985, the full 18 aircraft complement is now operational in the European theater. These aircraft have substantially increased the survivable surveillance and command and control capabilities of the NATO forces.

An example of our efforts to utilize commercial technology for military use and thereby reduce costs and shorten acquisition time is the Mobile Subscriber Equipment program. Procurement of off-the-shelf equipment for the program has begun. This program should allow the fielding of hardware with significantly less cost and less than one-third of the standard development time.

Defense-Wide Communications and Information Systems

Defense-Wide Communications and Information Systems provide a broad range of day-to-day and crisis communications and information for the management of both conventional and nuclear forces.

Major advances have been made in the Defense Switched Network (DSN), DoD's next generation long-distance telephone service, and the Defense Data Network (DDN), a survivable and secure data communications network. Acquisition of commercially available technology is beginning, and initial operation of Phase I of the DSN in some geographical areas is planned for FY 1986. In support of critical ADP communications requirements, the DDN will provide increased communications capacity and strengthened access controls. Network components have been installed in the Pacific Theater and the European Movement Information Network has been integrated into the Military Network (MILNET).

Modernization of the Worldwide Military Command and Control System (WWMCCS) Automated Data Processing (ADP) capabilities is being conducted under the WWMCCS Information System (WIS) program. Major contracts for the development of hardware and software have been awarded, and deployment of Block A hardware and software is scheduled for FY 1988.

Other ADP modernization efforts include upgrades to ADP systems at the NORAD-Cheyenne Mountain Complex needed to satisfy C^{3}I requirements for space operations and replacement of the Command Center Processing and Display System. Competitive design contracts for the Command Center Processing and Display System-Replacement (CCPDS-R) were awarded in FY 1985. When completed, the CCPDS-R will provide improved display of warning information for the nation into the year 2000.

Significant progress has also been made in improving and expanding the application of security equipment and techniques for computer and communications systems. In support of the continued dynamic growth of ADP operations in government, a computer security criteria was developed by the Computer Security Center of the National Security Agency, and research and development efforts have been focused on expanding new technologies which ensure proper access and protect sensitive data bases. A major initiative within the more mature Communications Security (COMSEC) technology is the development and acquisition of low cost, convenient and secure telephones for use throughout the Federal Government and the contractor communities who conduct classified or sensitive matters with the government. Other development efforts of particular note include initiatives to eliminate hard copy and paper based systems and initiatives to increase the embedding of COMSEC in host systems, with the added benefits of space and cost savings.

Global Positioning System (GPS) is a major project for improved worldwide combat enhancements through highly accurate positioning and timing capabilities. Satellite production is continuing with the launch of the first operational satellite scheduled for 1987. Deployment of an 18 satellite constellation is scheduled for 1989, and full deployment of operational user equipment is planned for completion by the late 1990's. Full operational deployment of the GPS will provide much needed capabilities that are unavailable under any existing single system or combination of systems.

Electronic Combat and C^3 Countermeasures

Electronic combat and C^3 countermeasures focus on preventing the hostile use of the electromagnetic spectrum, protecting friendly C^{3}I systems, and disrupting an adversary's C^3 systems.

An important first step toward achieving an improved electronic combat and countermeasures acquisition and investment strategy was realized in FY 1985 with the publication of the DoD Electronic Warfare Plan. This plan provides the framework for future electronic combat techniques and equipment development from planning to employment.

Additional major strides during FY 1985 include the initiation of Development Test and Evaluation (DT&E) of the joint Air Force/Navy Airborne Self-Protection Jammer (ASPJ) for our front-line fighter/attack aircraft. Another joint Air Force/Navy program, the Integrated Electronic Warfare System (INEWS)/Integrated Communications Navigation and Identification Avionics (ICNIA), has been established to develop integrated electronic combat capabilities and avionics for new design aircraft.

Also during the past year, the Air Force completed initial development and deployment of the COMPASS CALL aircraft, an airborne jamming system designed to degrade an enemy's C^3 capability.

Defense-Wide Intelligence

As the need for intelligence support has become more vital in meeting our worldwide commitments, we must ensure the compatibility, interoperability, and survivability of our intelligence systems. To this end, significant advances in developing integrated intelligence architectures were accomplished during FY 1985 under the Theater Intelligence Architecture Program, Intelligence Communications Architecture Program, and the Imagery Acquisition and Management Plan. Aggressive pursuit of these and related planning activities has improved the focus and effectiveness of the intelligence program.

To support the intelligence capabilities of the theater commands, TR-1 aircraft are being fielded. These aircraft are being acquired both within budget and ahead of schedule. As a related effort, fielding of the ASARS II, an advanced synthetic aperture radar system for the TR-1 aircraft, began in FY 1985 in the European Theater. In the coming years, additional advanced collection platforms and sensors will be developed to give field commanders the ability to look deeper into enemy territory with greater accuracy.

In like manner, we are improving our ability to process and exploit collected intelligence in a timely manner. Under the Joint Tactical Fusion Program (JTFP), we are developing an objective automated fusion capability for the Army and the Air Force to be fielded beginning in the late 1980s. Today, interim systems that provide lessons learned for JTFP development are located with selected units. As an example, the Limited Operational Capability Europe is supporting operational requirements for the European theater. Further, it is being used in a two year test under NATO's Battlefield Information Collection and Exploitation Systems activity (part of the Secretary of Defense's Emerging Technologies initiative with NATO) to develop interface requirements for supporting coalition warfare through the sharing of tactical intelligence with our allies. Using this near-term/mid-term approach, we are evolving an effective capability to support the commanders' need for timely, accurate information.

In addition to these and other programs aimed at placing equipment in the field for increased intelligence capabilities, we are continuing to stress improved intelligence training. Intelligence training systems are being enhanced and investments in foreign language programs for personnel associated with intelligence activities are continuing.

Special Operations

C^3I special operations efforts focus on the coordination and oversight of research and development in support of special operations and counterterrorism activities. Significant accomplishments achieved in Special Operations Forces (SOF) mission areas include: the procurement of additional Combat Talon II infiltration/exfiltration aircraft; upgrading additional air refuelable helicopters with adverse weather, night and terrain following capabilities; and increased aircraft readiness through a robust spare parts procurement program. In addition, new assault craft are being purchased for Naval Special Warfare units and the capabilities of swimmer delivery vehicles are being improved. We are also continuing to develop new SOF equipment such as remotely piloted vehicles, special avionics, improved exfiltration systems, underwater breathing devices, and lightweight, secure radios. Future plans include developing new technology to reduce the weight and volume that SOF teams must carry.

LOOKING TO THE FUTURE

As we continue to move forward with the C^3I improvement initiatives started under the President's Strategic Modernization Program, it is important that emphasis be placed on maintaining a balance between existing and future weapons systems and their supporting C^3I systems. Such a balance is critical in attaining affordable force management capabilities and essential to providing the rapid response and connectivity necessary for the fulfillment of our deterrence strategy. To achieve this balance we must:

- Ensure that our C^3I systems are as survivable and endurable as the weapons systems they support.

- Intensify the life-cycle management of C^3I through the support of existing management improvements such as the Joint Tactical C^3 Agency and adoption of new initiatives aimed at increasing both the performance and cost-effectiveness of C^3I assets.

- Provide the overall systems architectures and plans necessary to direct the evolution of C^3I capabilities.

- Continue the parallel development and acquisition of C^3I and associated weapons systems in order to assure the timely and effective utilization of these systems.

VI. DEFENSE WIDE INITIATIVES

SCIENCE AND TECHNOLOGY

The effectiveness of modern military forces in a large measure is determined by the quality and quantity of materiel and support provided to the Armed Services. In order to satisfy the need for capable, reliable and affordable equipment, the DoD maintains a strong Science and Technology (S&T) program which is the foundation of our RDT&E program. Thus the S&T program, through the technological progress it promotes, increases the deterrent value of U.S. forces and acts as a hedge against Soviet technological surprise.

A principal objective of the S&T program is to maintain a technological lead over potential adversaries. The maintenance of this lead is becoming increasingly critical as the Soviets field higher quality equipment for their forces. Therefore, we must ensure not only that our military technological base is viable and strong but also that our national technology infrastructure is second to none. The combined efforts of industry, universities and government laboratories are essential to the maintenance of a strong military technology posture.

The S&T program is managed by the Services and Defense Agencies. It covers a wide range of technologies and projects of importance to the military. These programs cannot be covered in detail by this statement; however, selected S&T activities will be highlighted in the following paragraphs.

Integrated Circuit Technology

The Very High Speed Integrated Circuits (VHSIC) program increases the United States' lead in integrated circuit technology. Most of the VHSIC 1.25 micrometer integrated circuits are functional with thousands of sample chips available for weapon system insertion. In addition, a number of brassboards that provide signal processing capabilities at the leading edge of technology are fully operational. Second generation VHSIC chip development is underway and devices are being delivered for DoD testing with 0.5 micrometer minimum feature sizes. The second generation VHSIC chips will produce another 50-100 fold increase in signal processing capability.

A new program has been initiated that is oriented towards providing major improvements in the sensor electronics, the 'eyes and ears' of electronic systems. This effort will focus on monolithic gallium arsenide integrated circuit technology and will emphasize analog functions for microwave and millimeter wave military applications. The Microwave/Millimeter Wave Monolithic Integrated Circuits (MIMIC) program is application oriented and calls for rapid technology insertion into existing and future military systems. MIMIC will provide advanced capabilities in analog circuitry for affordable applications in aircraft, missiles, surveillance and other military systems.

Basic Research

The basic research program provides fundamental understanding and concepts required for long-term technical superiority. Examples of the research accomplishments from this program are the advanced composite materials analysis techniques formulated by Drexel University and the laser-tomographic flow field visualization technology developed by the University of Michigan. These results will impact military structural and airframe design and analysis.

Major efforts are being made to improve the coordination with and the capabilities of the universities performing DoD research. In September of this year, the President established a policy on the transfer of scientific, technical and engineering information. This policy enhances significantly DoD's relations with universities and industry by establishing that, to the extent possible, the dissemination of results from federally funded fundamental research will be unrestricted. In addition, the University Research Instrumentation Program enhances the effectiveness of university programs and the University Research Initiative underscores our commitment to accelerate the process of strengthening university research in defense related technologies. These actions will enhance the basic research program of the Department.

Strategic Computing

The Defense Advanced Research Projects Agency (DARPA) is undertaking technology programs in artificial intelligence, multi-processor system architecture and optical and micro-electronic devices with the objective of developing a class of "intelligent" systems that will provide additional dimensions to weapons and equipment. Such smart computers will be used to demonstrate important applications via the autonomous land vehicle, airplane pilot's associate and battle management projects. Follow-on systems employing this technology, with suitable sensors, will be able to help humans reach reliable conclusions in intelligence assimilation, target discrimination, target assignment and other difficult tasks faster and more accurately than with present conventional computing systems. In addition to improving the functional performance of future defense systems, the strategic computing program promises very favorable return-on-investment because of its innovative character and potentially widespread application throughout the Services and Defense Agencies.

Aircraft Propulsion Technology

Aircraft propulsion continues to be a high-payoff technology for DoD. In recognition of the long-term prospects, an innovative integrated exploratory and advanced technology development program aimed at increasing the capability of aircraft turbine engines by 100% by the turn of the century is being formulated. The major feature of this program is an integrated materials/propulsion technology effort to permit higher payoff/higher risk approaches in exploratory development. The program will be fully defined this year, and will lead to large increases in aircraft capability. For example, it is expected that a sustained Mach 3 plus capability in an F-15 size aircraft and intercontinental ranges in an air launched cruise missile size vehicle will be possible. Conducting a vigorous aircraft propulsion technology program in order to both maintain our military posture and national preeminence is an important aspect of the DoD S&T program.

Advanced Aircraft Technology

The aircraft technology program continues to focus on the integration of aircraft functions to provide increased operational capability and enhanced survivability. The current emphasis is on the integration of flight controls with propulsion controls featuring thrust vectoring/thrust reversing exhaust nozzles for short takeoff and landing (STOL) and increased maneuver performance. The work is being pursued on a specially modified F-15 aircraft which is projected to takeoff and land in 1500 feet. The first flight of this aircraft is scheduled for FY 1987 to demonstrate technologies which are applicable to the Advanced Tactical Fighter or can be retrofitted to upgrade existing fighter aircraft. Increasing the combat capabilities of future military aircraft is an essential part of our modernization program.

Armor and Anti-Armor

The protection of our forces with armor capable of withstanding hostile firepower and also providing them with offensive options for defeating hostile armor forces continues to be a major factor in the seesaw exchange of force and counterforce. To improve our posture in the armor arena, DARPA has initiated a broad research and development program which includes fundamental mechanisms and phenomenology, mathematical models, improved measurement techniques, and development of advanced armor materials. In developing better means for defeating armor, recent advances in millimeter and infrared sensors and the hypervelocity electromagnetic gun programs will be exploited. The objective is to demonstrate a new family of low cost terminal homing munitions compatible with both conventional and advanced launchers. The need to establish and maintain a United States advantage in this area is critical to future battlefield outcomes. These efforts will be a significant step toward achieving this objective.

Computers and Software

The DoD Software Initiative has made major strides toward its goal of improving our capability to develop reliable, cost effective software for mission critical computer systems. Ada, the Department's standard programming language, is winning wide acceptance and many compilers have been validated. In addition to use by U.S. forces, Ada has been adopted as NATO's standard programming language and is one of two languages authorized for use in the United Kingdom's defense systems. The Software Engineering Institute is now operational and is working on techniques to accelerate transition of software technologies from the laboratory into use in mission software. The Software Technology for Adaptable, Reliable Systems (STARS) Program has made progress toward developing approaches for the development of software with reduced cost, higher reliability, greater reuseability and increased effectiveness. Technological progress is necessary in the software area because of the increasingly important role it plays in the performance of most modern weapon systems and equipment.

Training Technology

As training of both active and reserve forces is a major peacetime activity, it is important that we do it well and at acceptable cost. Technology advances in computer software, electroluminescent displays, voice synthesis and recognition and computer generated imagery make possible a range of options for increasing training effectiveness. For the maintenance technician, a portable training and job aid device will be demonstrated. This briefcase size device will weigh less than 30 pounds and could replace, if needed, approximately 25 linear feet of manuals and instructional material. In addition, the development of lower cost visual systems will be emphasized so that real world visual scenes that provide better training can be used in more simulators. Realistic and affordable visual scenes are one of the key component of a wide range of training simulators. Training is a major DoD expense and we will continue to apply technology to make training better and make it more cost effective.

Materials and Structures

During FY 1987, the materials and structures technology program will emphasize the survivability of aircraft and missile structures against potential enemy directed energy weapons. While the principal effort will address the laser threat, the program will also include protective concepts for military equipment subjected to high power microwaves and particle beams. These efforts will be directed towards evolving innovative material and structure hardening techniques using unique combinations and structural arrangements of coated metal-matrix and carbon-carbon composite materials. Important advances already have been made to demonstrate the survivability characteristics of metal-matrix composites against possible threats. We will continue to emphasize the development of other materials and structures that will withstand the rigors of directed energy devices.

Laser Technology

Significant progress has been made in laser technology developments. Work is being undertaken on technologies to improve the efficiency and utility of medium power lasers that could have near term military applications. Our goal is to provide inexpensive and reliable lasers that improve the combat capability of our soldiers, armor and combat aircraft. Lasers have significant military potential and it is important that a balanced program in offensive weapons, countermeasures to hostile lasers and protection of our personnel be conducted in order to achieve objectives of this technology program.

Hypersonic Technology Program

The DoD has initiated joint planning with NASA for a National Aerospace Plane research program. The new activity is based on hypersonic research carried out by DARPA and NASA for a number of years. The concept centers on a hydrogen fueled aircraft capable of horizontal takeoff and landing, operating at speeds between Mach 12 and Mach 25 at altitudes between 100,000 and 350,000 feet. The approach involves the maturation of key technologies including propulsion module development and airframe design of an experimental flight research vehicle. Successful demonstration of this concept could lead to expanded capabilities in global reconnaissance, improvements in long range air defense, reduced space transportation costs and high speed global transportation.

Nuclear Effects Technology

The Defense Nuclear Agency ensures that strategic and theater forces are provided the technology to operate in a nuclear environment as well as providing information that will permit prediction of destructive thresholds of enemy systems. In addition, underground nuclear tests are conducted that provide design information to reduce uncertainties associated with safety margins, risks and costs.

The FY 1987 program includes a number of important research and development events. Two underground tests are planned that will provide survivability requirements for TRIDENT II and other critical systems. Work will continue on the development of electromagnetic pulse standards and specifications to protect equipment against intense current surges and electromagnetic fields. A research satellite will be launched to gather radio scintillation and other atmospheric data required to predict performance of command, control and communications systems. In addition, research and development will continue on radiation hardening of emerging microelectronic components that will be capable of operation in tactical and space environments.

The survival and operation of our forces are key considerations of the Unified and Specified commands. Towards this end, the understanding of nuclear phenomena, the design of equipment and facilities to withstand nuclear effects, the physical protection of nuclear weapons and storage sites, and the hardening of electronics are being examined. These fundamentals are essential for effective military operation, and are the focus of the nuclear effects technology programs.

TEST AND EVALUATION (T&E)

Test and Evaluation management within the Department of Defense has continued to receive considerable review and refinement within the past year. The Test and Evaluation Policy Directive -- DoDD 5000.3 -- is being reissued to define more stringent management policies in line with the Department's emphasis on operational test and evaluation as well as to place more emphasis on up-front development and qualification testing. Initiatives to enhance the overall quality of Test and Evaluation methodology and resources in the Department and to develop advanced threat simulators have also moved forward. The Services' adoption of several new NATO-produced systems tested under the Foreign Weapons Evaluation Program will contribute to other initiatives underway to induce more allied participation and support of the NATO Alliance.

Enhancing Our Defense Systems Test Capabilities

The tri-Service development program established to develop threat simulators has created a data base for use in simulating the latest, most capable threat air defense systems. An integrated program is consolidating scientific and technical intelligence, surrogate testing, and simulator development. Inventories and shortfalls have been cataloged and requirements for additional threat simulators are being identified.

A Supersonic Low-Altitude Aerial Target is being developed to replicate the high speed, low altitude dash threat of anti-ship missiles by late 1989. A new subscale subsonic target will also replace older, costlier systems and provide testing for counterair systems by 1989. A new Army helicopter aerial target, needed to test battlefield air defense systems, is now under development and is expected to be fielded by 1987.

A two volume Software Test and Evaluation Manual has been issued for use throughout the Department of Defense and Defense industry. This is one of several ongoing efforts aimed at improving the test and evaluation of major systems through improved acquisition management and risk reduction procedures. The manual contains important implementing tools which will be applied in support of existing and planned policy for the test and evaluation of software intensive systems.

Modernization of our test facilities and resources is continuing with such programs as the Navy's Extended Area Test System at the Pacific Missile Test Center and the Air Force's Aeropropulsion Systems Test Facility (ASTF) which will reach operational capability in 1986. The foundation for a new generation of range Time Space Position Instrumentation (TSPI) systems was established when the tri-Service Global Positioning System/TSPI (GPS/TSPI) program entered full-scale development in 1986.

Joint Test and Evaluation (JT&E) Programs

Five ongoing tests will examine the capability of developmental and deployed systems to perform their intended missions in a joint environment in FY86. These tests include evaluation of Command, Control, and Communications Countermeasures; Identification of Friend, Foe or Neutral Systems; Forward Area Air Defense Capabilities; Electro-Optical Guided Weapon Countermeasures and Counter-countermeasures and live munitions effects on foreign and domestic armor and aircraft.

International T&E Initiatives

Under the provisions of an international T&E agreement concluded with Canada, the Air Force successfully completed a captive carry flight and two free flight tests over Canada of the Air Launched Cruise missile during the winter of 1985. Operational test flights will continue this winter. The Canadian-U.S. agreement is affording the Department a unique opportunity to test weapons systems in realistic battlefield conditions and geophysical environments replicating those in Europe and Eurasia. Cooperative agreements are being formulated with France, the United Kingdom, Israel, and the Peoples' Republic of China to assist them in the long term improvement and modernization of their testing capabilities and to create the standards where in we and they can accept test data on a bilateral basis.

The Foreign Weapons Evaluation Program has resulted in 25 items of equipment being selected for U.S. inventory with a procurement value of over two billion dollars. By capitalizing on the research and development efforts of our allies, we have been able to obtain nearly $40 of procurement value for every test dollar invested compared to a return of $3.20 in procurement value for every RDT&E dollar invested in domestic programs. This successful program with its added features of increased interoperability and standardization with our allies, continues to enhance the international cooperation and provides an added incentive to our Allies to contribute more to our mutual defense.

Test and Evaluation Oversight

In addition to these initiatives, the Deputy Under Secretary for Test and Evaluation and the Director, Operational Test and Evaluation maintain continuous oversight on Service testing of over 150 acquisition programs. Top-level supervision of testing throughout the life-cycle of each major program is provided with the intent of ensuring effective, realistic testing; reducing redundancy in testing and obtaining the maximum use of critical test and evaluation resources. Approval authority is maintained over the Test and Evaluation Master Plans for major systems and tests in process are monitored in order to provide a comprehensive assessment of all test results to support major program decisions. This oversight has resulted in enhanced efficiency in the use of critical test resources, focused increased attention to the correction of critical system deficiencies, and resulted in a sound basis for decision.

WEAPON SUPPORT AND LOGISTICS R&D

Research and Development to reduce weapon support requirements and improve logistics operations is increasing as a result of the setting aside of FY86 funds to increase activities in these areas. Major efforts now underway include improvement of maintenance diagnostics capabilities, reliability and maintainability improvements, and Computer Aided Logistic Support (CALS). Diagnostic capabilities improvements are being sought through the development of computer-aided design applications and use of expert system technology to improve troubleshooting. The objectives are to develop very accurate diagnostic tools, (such as built-in test), reduce the size of the external test equipment, and reduce maintenance training and skill level requirements. A number of field demonstrations of improved diagnostics capabilities are planned over the next three years for both new systems (B-1B) and fielded systems (Apache and Blackhawk). Substantial improvements will also be achieved in the reliability and maintainability of equipment for use in future weapon systems through technology programs such as the Air Force "R&M 2000" program. Another high priority objective is to improve the usefulness, quality, and timeliness of logistics technical information, such as engineering drawings and technical manuals, through automation and system integration of DoD and contractor data bases. These technology efforts are crucial to the recent DoD initiative on CALS, which seeks to transition from our current paper-intensive logistics processes to a largely automated mode of operation for weapon systems entering production in 1990 and beyond.

SPACE

The Soviet space program is large, dynamic, and expanding. It now encompasses almost 100 launches per year, with over 140 satellites operational at any one time. Their activities in space indicate that the emphasis in the Soviet program is on military objectives: providing support to their own military forces and developing the ability to deny use of space to enemy military forces. They attach lesser emphasis to the civilian aspects of their program: earth sensing, lunar and planetary exploration, and astronomy. These account for only a fraction of their launches. The size of the Soviet program--which is significantly larger than that of the U.S. and its greater emphasis on military activities is indicated on Figure VI-1.

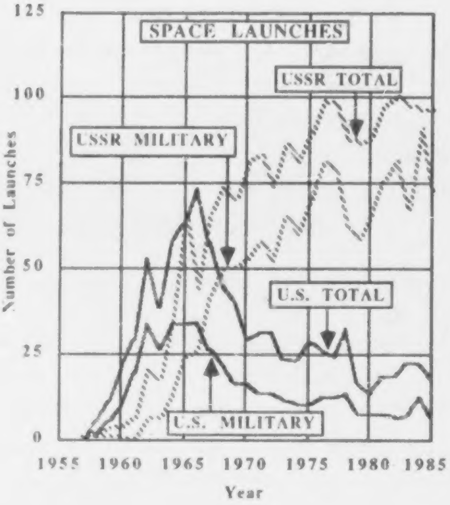


Figure VI-1. U.S. and USSR Space Launches, 1957-1985

The Soviets do not advertise the fact that their space systems, both unmanned and manned, have military applications, nor readily admit that they have developed any purely military space systems.

The U.S. maintains nearly the same number of satellites active in orbit as does the Soviet Union. However, by virtue of longer spacecraft operational lifetimes, it is able to do so with significantly fewer launches. Despite the four times greater launch rate, and total annual payload lifted to orbit, the cost of the Soviet space program is estimated to be only about twice that of the U.S. The lower Soviet unit cost is due both to their use of less sophisticated spacecraft and to their longer launch vehicle and spacecraft production runs. In addition, their relatively high launch rate contributes to the intrinsic robustness and flexibility of the Soviet space launch infrastructure.

The Soviets have three space assembly and launch complexes, located at: Tyuratam, Plesetsk, and Kapustin Yar. Major new launch and support facilities are nearing completion at Tyuratam for a family of new space launch vehicles and reusable spacecraft (see Table VI-1). Operational

Table VI-1. U.S./USSR Space Modernization Programs

U.S.		USSR	
System	**Qualitative Trends**	**System**	**Qualitative Trends**
		Space Vehicles	
Space Shuttle	• Place DoD satellites in low earth orbit	Space Shuttle	• Reusable space transportation system
Centaur Development as Upper Stage	• Provides upper stage to place DoD payloads in high orbit	Heavy-Lift Launch Vehicle	• Space shuttle counterpart, augmentation to Saturn-V class
Complementary Expendable Launch Vehicle (CELV)	• Supports assured access to space	Medium-Lift Launch Vehicle	• Supports high launch rates
		Payloads	
Navy Remote Ocean Sensing System	• Naval oceanographic satellite	GLONASS Navigation Satellite	• Worldwide precision navigation and positioning
Defense Satellite Communications System III (DSCSIII)	• Improved jam resistance for command, control and early warning	Satellite Data Relay	• Worldwide near-real-time data transmission
Milstar Satellite Communications System	•Assures survivable and enduring wartime communications connectivity		
Navstar Global Positioning System	• Precision all-weather navigational data		

capabilities for these new facilities and systems will probably be achieved in the late 1980's to early 1990's. The U.S. Space Transportation System (Space Shuttle) and its launch facilities are comparable developments, now almost fully operational.

The new Soviet heavy lift launch vehicle is estimated to have the capability to lift up to 330,000 pounds to low orbit, far exceeding their prior maximum of 44,000 pounds and in the same class as the discontinued U.S. Saturn. The U.S. Space Transportation System can place 65,000 pounds of payload into low earth orbit.

The Soviets have continued to expand their operational capability in space, as evidenced by their resumption of space station activities, their efforts associated with the development of a new family of launch vehicles, including a shuttle like ours and a small space plane, and increased on-orbit assets. Clearly, their objectives are to expand their warfighting capability utilizing space assets and to integrate the use of these systems with terrestrial forces

Our specific objectives in space are focused on pursuing a vigorous research and development program that will have potential high military payoff, defining methods that address reliability, maintainability, and supportability of our space assets, and providing an assured access to space through the combination of the space shuttle and unmanned launch vehicles.

With regard to unmanned launch vehicles, we have initiated two programs that will significantly support our requirement for assured access to space. The first is the Complementary Expendable Launch Vehicle (CELV) program which will provide a complement to the shuttle for heavy geosynchronous payloads launched from the east coast. The second is the Titan ICBM refurbishment program. These vehicles will support those small payloads going to unique polar orbits from Vandenberg that would otherwise be flown on the shuttle in a less efficient manner.

Speaking of Vandenberg, we have recently activated the shuttle launch facility and are preparing for the first mission. This will be a dedicated DoD mission flying the Teal Ruby and CIRRIS spacecraft. Because of the high media interest in this first Vandenberg flight, we have unclassified the mission. This flight will be the third dedicated DoD shuttle mission. The two previous missions from Kennedy were highly successful and demonstrated that we had corrected the anomaly problem with the Inertial Upper Stage (IUS).

The recent catastrophic loss of the Space Shuttle Challenger may result in possible setbacks to some of our national security space programs including slipping the first Vandenberg launch. Until we know for sure the cause of the accident and the resulting time to correct the problem, the actual impacts cannot be totally ascertained. Nevertheless, the Secretary of Defense has directed an assessment to address the impacts to current and planned programs and the capabilities and options available to launch those space systems vital to our national interests. The results of this assessment will be used to determine if any programmatic and/or policy decisions are warranted.

One specific program that we are investigating very closely deals with the work that DARPA has performed on hypersonic technology. This work appears to have significant potential for reducing space transportation costs. Additionally, the many spin-off applications of this technology will aid in maintaining U.S. leadership in aeronautics and the commercial use of space.

Space related research and technology continues to be an important part of our overall research and development effort. We have recently initiated a study, together with NASA, to define the next generation space transportation system. What is unique about this effort is that we are looking at the whole picture of space transportation, not just the launch vehicles, but the ground and on-orbit operations as well. Our objective is to develop a plan that will provide an investment and technology development strategy to support future national security, civil, and commercial space transportation needs beyond 1995.

INTERNATIONAL ARMAMENTS COOPERATION

Goals

The basic goal of our international armaments cooperation program is to develop, field and support--through equitable burden-sharing--the most effective and interoperable conventional military equipment for both U.S. and friendly nations forces. This requires collaborative programs based on the principle of equity--sharing both risks and benefits.

Specific Objectives

A credible collective non-nuclear forces capability within NATO will require substantial investment by the U.S. and Allied governments. Armaments cooperation is a key incentive to economically achieve these investments. Thus, our objective is to create an environment which fosters maximum use of combined technological and industrial capabilities by working within the NATO Conference of National Armaments Directors (CNAD), through individual bilateral and mutilateral agreements for specific development and production programs, and by placing emphasis on utilizing the broad industrial infrastructure for cooperation which exists in international industry-to-industry relationships.

The U.S. shares strategic and security concerns with other allies as well as friendly nations with whom we have no alliance arrangement. We will expand cooperation with these non-NATO Allies and friendly nations and will assist them in developing and maintaining mutually beneficial, indigenous defense capabilities. We will approve the sale of defense equipment, with appropriate safeguards taken to keep technology secure from exploitation by our adversaries, to those nations whose policies are in consonance with ours and those of our NATO Allies.

Major Accomplishments

NATO Armaments Cooperation and Defense Trade

The Congress, in the Roth-Glenn-Nunn amendment to the 1986 Department of Defense Authorization Act, has recognized the benefits of an improved free world's defense posture to be realized through cooperation with our allies in the research, development, production, and fielding of armaments systems.

We must leave no doubt of our commitment to maintain adequate Alliance conventional capabilities. Armaments cooperation built on a solid appreciation for the commitment to the protection of the West's technological lead is one of the primary means to maintain these conventional capabilities. In establishing operational and design requirements for future major weapons systems, we consult with European counterparts. Cooperative joint research, development, production and acquisition programs will be thoroughly explored, particularly where common operational and design requirements can be established; mission effectiveness would be maintained at an acceptable level; technology sharing, on a bilateral basis, would provide near equal benefits to cooperating nations; economies of scale and/or avoidance of duplicative costs are possible; and standardization and interoperability of NATO forces and equipment would be enhanced.

Congressional authorization to set aside $250M to be used exclusively for NATO cooperative programs and the $125M appropriated in FY 1986 are strong and much appreciated signals from the Congress in support of arms cooperation with our NATO allies. Our actions will reinforce our commitment to Allied cooperation and be fully in keeping with the Congressional intent of this resolution.

We are moving forward on a number of fronts to increase transatlantic defense industrial cooperation. The Services have taken a number of actions that have focused on increased interaction and cooperation with our NATO partners. The Services have been asked to thoroughly consider allied capabilities before any new developments are begun. They will give special management attention to collaborative development programs, and acquisition of existing equipment from other Alliance nations.

The Emerging Technologies Initiative was launched within NATO to assure priority on the application of emerging technologies in improving conventional military capabilities. A small number of force multiplying systems have been endorsed by Ministers for special tracking and management attention under the purview of the CNAD, with a view to acheiving in-service dates as close to 1990 as practicable.

The Department of Defense has an ongoing Foreign Weapons Evaluation Program funded at $17M in FY86. The objective of this program is to evaluate foreign weapons, which are in development or in service, that might be purchased or developed further for inclusion in the U.S. inventory. While the sums involved are small in relative terms, the results are significant in terms of reducing U.S. R&D costs, accelerating the introduction into service of new systems, promotion of standardization and interoperability of fielded systems with our allies, and achievement of procurement cost advantages.

Non-NATO Armaments Cooperation and Defense Trade

- Northeast Asia (Korea, China)

In Northeast Asia, we continue to assist the Republic of Korea through technological consultation and cooperative armaments development; i.e., tank and missile development. We are thereby strengthening the capabilities of that nation to maintain its freedom and independence.

Modernization of the People's Republic of China's defensive capability is being supported within specific mission areas; i.e., anti-tank, air defense, artillery, and surface ship anti-submarine warfare. These do not threaten the security of the U.S., its allies, or other friendly nations in the Pacific Basin, but are significant in the growth of common interests between our nations. Congress has been advised of our initial Foreign Military Sales case with China which covers artillery fuzes and detonators. Other sales and co-production programs are under active discussion.

- Two-Way Technology Cooperation with Japan

As Japan has a considerable base of technology that could benefit U.S. defense systems, we have expanded our efforts to develop technology and systems cooperation with Japan, with particular emphasis being placed on encouraging a flow of Japanese military technology to the U.S. The benefits of increased cooperation with Japan are several: (1) a strengthened U.S. industrial base, resulting from the infusion or stimulus of Japanese technology in those areas in which Japan has a lead; (2) more efficient use of our R&D resources, as we avoid duplicating Japanese development efforts and focus our attention on developing and introducing better systems sooner; and, (3) improved interoperability with Japanese fielded systems, thereby strengthening the security force structure in the Northern Pacific. In this regard, we are pursuing the August 1984 recommendations of the Defense Science Board (DSB) and work regularly with private sector advice from the Defense Policy Advisory Committee on Trade (DPACT).

Each of the Services has designated a Senior National Representative (SNR) to organize and manage a coherent program of technological cooperation with Japan and to be the principal contact within his Service to explore possibilities for joint research and development. Separately, technical experts in specific mission areas assess the threat, the systems and technologies available to meet that threat, and the systems and technologies in development and needed for development in that specific mission area. The first two of such groups have been established in the air defense and C^3 mission areas. We have completed a survey and published a report on the Electro Optics/Millimeter - Microwave(EO/MMW) industry in Japan, and worked out with the Japanese government procedures for the transfer of Japanese military technology to the U.S.

- Southeast Asia, South Asia and Australia

In Southeast Asia, programs of mutual benefit are being explored with Indonesia and Singapore, and we are working closely with other nations in the area against a backdrop of greater Soviet presence in the South China Sea. Cooperative programs with Australia continue to progress and new initiatives are under discussion. Evolving technical cooperation with India is a dynamic development which is being pursued in the wake of Presidential initiatives in the Asian subcontinent.

- Industrial Cooperation with Pakistan

In Pakistan, defense industrial cooperation is becoming a significant factor in the U.S.-Pakistan relationship. This agreement, which is designed to improve the defense industrial base; i.e., tank overhaul, aircraft overhaul, and munitions production. The cooperation will increase in importance as Pakistan's forces acquire more U.S. equipment under our security assistance to that nation.

- R&D Efforts with Friendly Middle East Nations

Cooperation with Israel continues and has provided valuable battle tested information and equipments to the U.S. The Memorandum of Agreement between the U.S. and Israel has led to significant exchanges of technical information, cooperative R&D programs on new systems, exchanges of scientists and engineers, and U.S. procurement of proven Israeli weapon systems.

The U.S.-Egypt Defense Production Assistance Agreement remains an important part of our relations with Egypt. This program, is designed to improve Egypt's defense industrial base; i.e., tank overhaul and radar production. It is a principal element in our relationship with one of the leading nations in this critical region of the world.

- Latin America

We are investigating the feasibility of defense industrial cooperation programs in the Central American region. We expect to aid Central American countries to assess some of their most important military requirements and to help them establish industries which can economically support their defense capabilities. Bilateral cooperation with Brazil has been enhanced through cooperation in scientific and engineering exchanges and will be developed further as the size and sophistication of Brazil's defense industry grows.

Challenges and Opportunities

We must continue to look to international cooperation in the research, development and production of armaments as a means of strengthening the security and economic base of the free world. Through partnership with our allies we can build better systems. With greater standardization and common procurements we can enhance economies of scale, lower procurement costs, and strengthen the interoperable character of our forces. In addition, involvement in industrial arrangements should result in more work for these industries, less unemployment, and more defense equipment for financial resources expended.

DoD currently has reciprocal memoranda of understanding with NATO allies to lessen or remove barriers to defense trade. Renewal of these agreements will begin in 1986, and the DoD has proposed to transition these bilateral agreements into a U.S.-NATO Europe agreement. This would be a step toward desired integration of the European defense market. Western security and technology cooperation in armaments within NATO will be greatly helped if Europe is able to organize defense research, development and production on a scale more comparable to the scale of the U.S. market. Through the Independent European Program Group in NATO and the Western European Union, important work toward this objective is already underway.

Japan is the second largest economy in the world and technologically mature. Our programs recognize the need to develop a new relationship and develop a two-way flow of technology.

We must recognize that most of the international cooperation with NATO, Japan, and others--will be carried out on an industry-to-industry basis. We emphasize development of a government-to-government environment that encourages such technology cooperation.

TECHNOLOGY TRANSFER

Purpose

The transfer and control of militarily-critical technology is inseparably linked to our international cooperative R&D efforts. Of paramount importance to DoD is the fundamental concern for the development, production and acquisition of superior quality weapon systems.

The sharing of our advanced weapons technology with our allies is in the foremost national interest of the U.S. Only through proper management of this technology transfer can its diversion to the Soviet and Eastern bloc countries be prevented.

Technology transfer is concerned with the transfer and control of munitions and strategic trade (dual use) products and manufacturing know-how, such as computer-aided design and manufacturing systems and automatic test and inspection equipment. Detailed technical discussions on a continuing basis are taking place between the U.S., Western Europe, and Japan on selective revision of the Coordinating Committee (COCOM) list to deny the Soviets key items without interfering with legitimate non-strategic trade.

The ultimate goal is to deny the Soviets and Eastern bloc countries documents, hardware, technologies, and manufacturing capabilities that will accelerate their military programs, while ensuring the health of the U.S./allied defense industrial base.

Major Achievements

A comprehensive review of the entire Militarily Critical Technologies List (MCTL) was undertaken to both remove technologies that no longer are deemed to be militarily critical and to include a number of newly developing technologies which have military significance.

Support was given to the preparation and negotiation of technical proposals to COCOM. Through our initiative COCOM has accepted new coverage in several areas previously uncontrolled. For example, major revisions to the International List were made in the area of robotics and automated industrial control systems. In addition, improvements were made to the International Munitions List particularly in the areas of SDI technologies where new controls were introduced. At the same time, out-of-date controls on lower-level technologies no longer of strategic significance, such as those on low-level personal computers, were eliminated.

Special studies were initiated to support technology security activities, for example, the studies of robotics technology and of Soviet technology needs pertaining to the MCTL. A program was initiated to examine the foreign capabilities for the MCTL entries. Over 200 items were analyzed in terms of the capability of other nations to supply items of equal quality in suitable quantity. Special studies also have been performed to examine current and future weapon systems in terms of their critical technologies and linkage to the MCTL. Furthermore, we are working with selected contractors to assess the technological capabilities of allied nations to provide support to the SDI program.

Goals-Short Term

As required by the Export Administration Act of 1985, a review of the Militarily Critical Technologies List (MCTL) will be made to ensure that it adequately reflects national security concerns while maintaining minimum interference with the export of non-critical technologies. The program to assess foreign capabilities for the MCTL will be accelerated.

This review will lead to a revised MCTL, and an unclassified version will again be published and released to the general public. Assistance will be provided to accelerate implementation of the MCTL in the export control process.

Technical proposals leadership, and support will be provided for COCOM negotiation of revisions to the International Control List.

We will continue to support the newly established Defense Technology Security Administration (DTSA) by providing advice and support for the technical aspects of the DoD technology security program.

Goals-Long Term

Primary attention will be given to facilitating the sharing of SDI and other military technologies with our friends and allies in accordance with U.S. international obligations, including the ABM treaty of 1972. This sharing will be conducted in such a manner as to safeguard these technologies against unauthorized transfer to potential adversaries.

Technical leadership will continue to be provided to support the U.S. objective of achieving a tighter control of critical technologies derived from the MCTL effort. Meanwhile, recommendations for reduction and elimination of product controls will continue for those technologies no longer judged to be strategically significant, thereby disposing of unnecessary burdens on U.S. exporters.

Through presently established forums, dialogue will continue with industry to improve their understanding of the critical technology transfer issues as they are related to U.S. foreign policy and national security objectives.

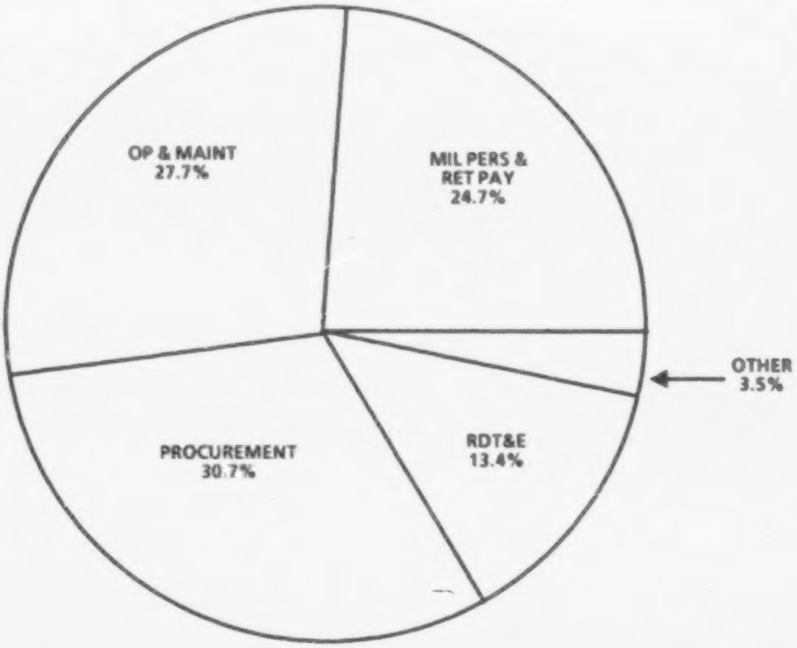
APPENDIX A

OVERVIEW OF RESEARCH AND DEVELOPMENT BUDGET

APPROPRIATION CATEGORIES AS A PERCENTAGE OF THE DEFENSE BUDGET

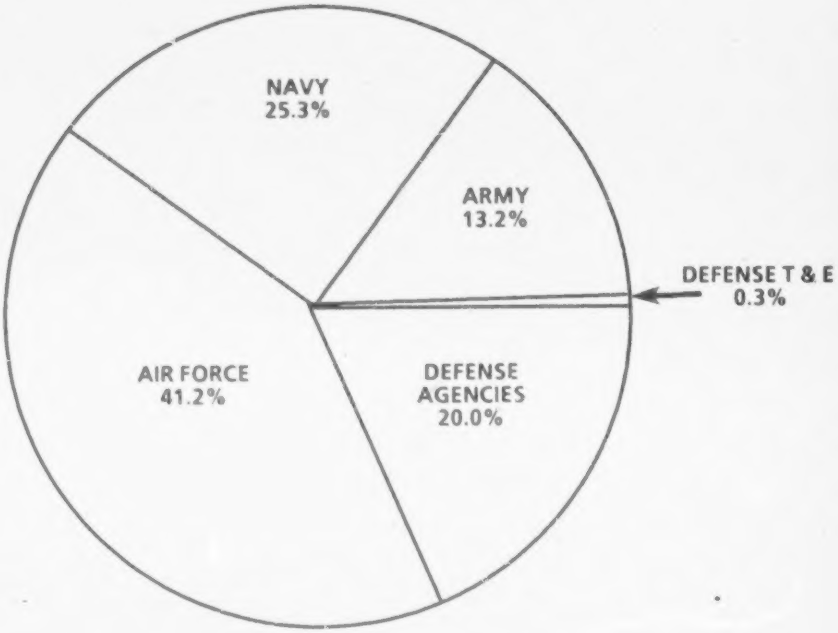
BUDGET AUTHORITY ($ BILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Mil Personnel	67.8	23.7	67.9	23.5	76.8	24.7
Oper & Maint	77.8	27.1	78.7	27.2	86.4	27.7
Procurement	96.8	33.8	97.3	33.6	95.8	30.7
RDT&E	31.3	10.9	35.5	12.3	42.0	13.4
Mil Con	5.5	1.9	5.6	1.9	6.8	2.2
Family Housing	2.9	1.0	2.9	1.0	3.4	1.1
Other	4.7	1.6	1.5	0.5	0.5	0.2
TOTAL DOD	286.8	100.0	289.4	100.0	311.6	100.0



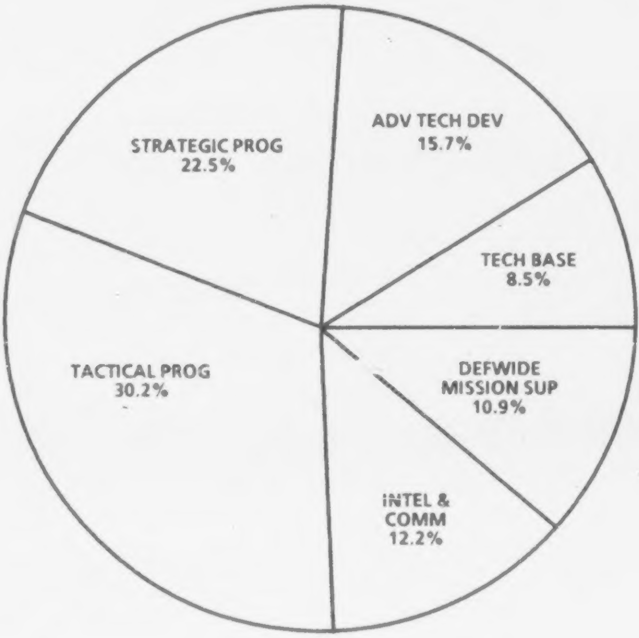
RDT&E BY COMPONENT
TOA ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Army	4305.2	14.0	4841.5	13.7	5550.3	13.2
Navy	9070.9	29.4	10076.9	28.4	10586.8	25.3
Air Force	13283.5	43.0	13787.4	38.9	17275.4	41.2
Def Agencies	4150.9	13.4	6642.4	18.7	8364.3	20.0
Def T & E	59.0	0.2	118.5	0.3	141.8	0.3
Def OT & E	--	--	--	--	11.3	--
TOTAL RDT&E	30869.5	100.0	35466.7	100.0	41929.9	100.0



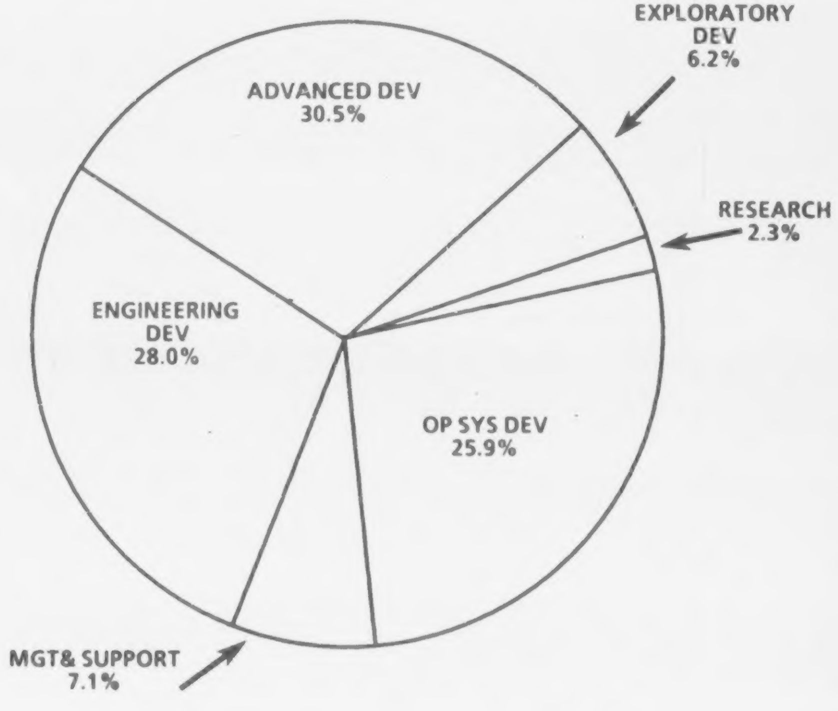
RDT&E BY BUDGET ACTIVITY
TOA ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Technology Base	3120.7	10.1	3449.1	9.7	3585.3	8.5
Advanced Tech Dev	2750.6	8.9	4234.3	11.9	6574.7	15.7
Strategic Prog	8169.0	26.5	8054.4	22.7	9429.6	22.5
Tactical Prog	9062.2	29.4	10901.0	30.8	12671.5	30.2
Intel & Comm	3953.0	12.8	4703.4	13.3	5102.9	12.2
Defwide Mission Sup	3814.0	12.3	4124.5	11.6	4566.0	10.9
TOTAL RDT&E	30869.5	100.0	35466.7	100.0	41929.9	100.0



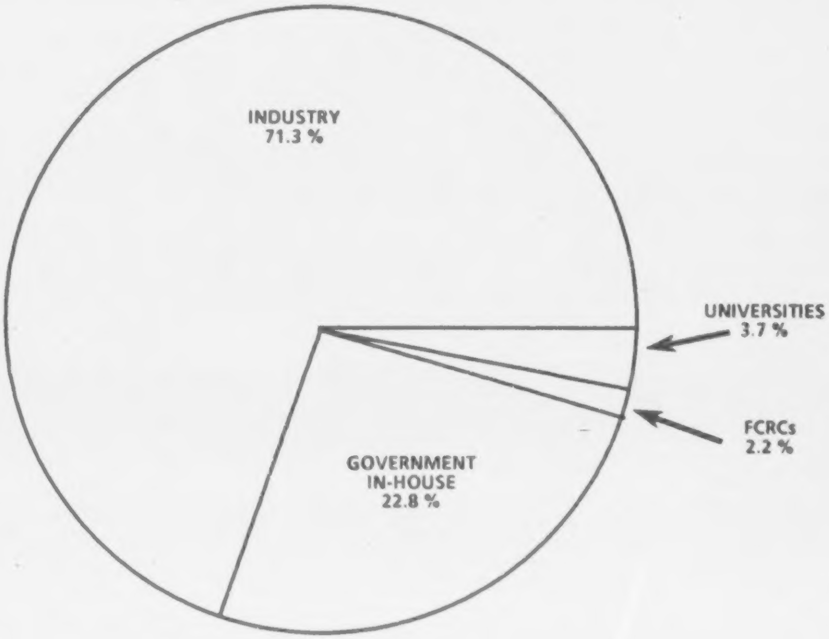
RDT&E BY R&D CATEGORY
TOA ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Research	852.3	2.8	1024.2	2.9	985.8	2.3
Explor Dev	2268.4	7.3	2424.9	6.8	2599.4	6.2
Adv Dev	6743.0	21.8	9875.3	27.8	12775.8	30.5
Engin Dev	10490.8	34.0	10149.3	28.6	11717.5	28.0
Mgt & Sup	2516.6	8.2	2611.1	7.4	2972.8	7.1
Op Sys Dev	7998.4	25.9	9382.0	26.5	10878.5	25.9
TOTAL RDT&E	30869.5	100.0	35466.7	100.0	41929.9	100.0



RDT&E BY PERFORMER
TOA ($ MILLIONS)
FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Industry	21961.6	71.1	25418.0	71.7	29895.8	71.3
Govt In-House	7069.6	22.9	7940.9	22.4	9570.7	22.8
Federal Contract Research Ctrs (FCRCs)	700.4	2.3	764.7	2.2	912.8	2.2
Universities	1137.9	3.7	1343.1	3.8	1550.6	3.7
TOTAL RDT&E	30869.5	100.0	35466.7	100.0	41929.9	100.0

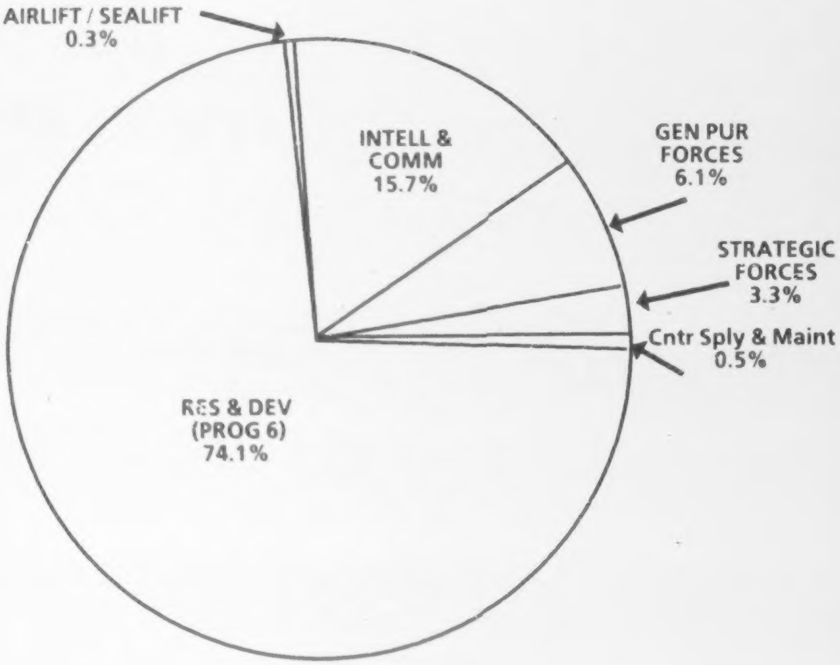


RDT&E BY DEFENSE PROGRAMS

TOA ($ MILLIONS)

FY 1987 BUDGET ESTIMATE

	FY 1985	%	FY 1986	%	FY 1987	%
Strat Forces	777.5	2.5	1109.4	3.1	1392.4	3.3
Gen Purp Forces	1931.5	6.3	2016.4	5.7	2578.9	6.1
Intel & Comm	5025.4	16.3	5931.1	16.7	6589.0	15.7
Airlift/Sealift	36.0	0.1	80.2	0.2	112.2	0.3
Guard & Reserve	--	--	--	--	4.5	--
R & D (Prog 6)	22871.1	74.1	26084.7	73.6	31051.4	74.1
Cntr Sply & Maint	212.9	0.7	235.2	0.7	192.2	0.5
Trng, Med, Other	5.2	--	5.2	--	4.8	--
Admin & Assoc Act	5.2	--	--	--	--	--
Spt Other Nations	4.7	--	4.5	--	4.5	--
TOTAL RDT&E	30869.5	100.0	35466.7	100.0	41929.9	100.0



MAJOR BUDGET SHIFTS

Senator STEVENS. Thank you. I want to get on the record some problems that we see developing. There are some major shifts in your budget this year that are hard for me to understand in terms of the obvious restrictions that are going to be imposed upon the defense bill this year.

The tilt rotor program is down $167.9 million. On the other hand, the Air Force C–17 program is up 239.5. TACMS, the Army's TACMS program is down 41.8 and yet we have a whole series of other things, SRAM up $130 million, Trident II down $471 million in this request and the small ICBM is up $771 million.

There are such violent fluctuations in the requests on ongoing programs. Why should there be such violent fluctuations on projects that are not completed yet?

Dr. HICKS. Mr. Stevens, I think we both agree that fluctuations are bad.

Senator STEVENS. It looks like you are stretching out some in order to get new ones in.

Dr. HICKS. That could be. It is difficult to give you an answer unless I can expand on specific projects which I will be glad to do.

NAVY TILT ROTOR

Let me talk about the one I know about which is the tilt rotor for the Navy. That program is going to DSARC--II, which means it will have to go through the DSARC--II Board sometime in the next couple of months before it can go into full-scale development.

The reason it is down, I believe, although I would have to look especially at that program, is that they were not going ahead as rapidly as they thought in the program development to reach the DSARC--II in time. On that basis they dropped the funding for this year.

What I would like to do is take each of those programs and give you a specific answer for the record which I will be glad to do, analyze each one to say at least when they went through our DRB why the Service position on these things was upheld.

As you know, the DRB is the place where, as far as the Department of Defense is concerned, our ultimate priorities between Service programs are reviewed and managed. To the extent that that is possible, that is done at the DRB.

The individual Services, of course, have their own ideas about their priorities and we in fact in the DRB very often overrule those priorities.

I will get you answers for the record on those programs you listed.

CEILING ON ONGOING AND NEW PROJECTS

Senator STEVENS. I did not ask that for the record. What I would like to ask is whether I am right that you had a ceiling outside of SDI, you have allocated that to both ongoing and new projects.

Is that about right?

Dr. HICKS. I think what we have tried to do is to keep a balance in the program to continue development of what we are going to need in the next 5 years without stopping progress that we believe will rule our future out to 15 years.

Senator STEVENS. My staff says if you take SDI out, there is no real growth in the fiscal year 1986 R&D budget.

Dr. HICKS. That is right.

STRETCHOUT OF OLD PROJECTS

Senator STEVENS. But there is a substantial number of new projects injected into it which means we are stretching out some of the old projects.

My basic question to you is: Is that good policy for your portion of the Department? Why should we not finish the ones we started and postpone some things?

I am a great defender and supporter of the C–17. Why start it if it means that the cost of the tilt rotor project increases because it is stretched out?

Dr. HICKS. It is not necessarily true, sir, that the cost of the tilt rotor will increase because it is stretched out before we go into full scale development. In fact, it may actually be a better situation because we will better define the program.

Up to the time of DSARC--II, it is very important to understand the requirements and to understand the specifications that are needed in a weapon system to meet those requirements. I find fault sometimes in the way that is done.

It is the job of my office to be certain it goes into DSARC--II, that those conditions are met. Let me give an example of the LHX program.

LHX PROGRAM

The LHX program still has not gone through DSARC--II. Last summer we had a Defense Science Board study on requirements, an excellent study. It was not anything that you would not have heard before, but it was well done and well documented in terms of preparing DOD programs, commercial programs and emphasizing strongly the need for requirements.

What we have done in order to know specifically how well the Army carries out that issue of requirements is to give the Defense Science Board a task force position and let it in fact sit with the Army and let the Army run through in a generic sense all of the requirements for LHX. That is happening right now.

Now, that is going to probably cause a slip in LHX in terms of when it starts full-scale development. When it does start, I will feel comfortable, first of all, that we know that we have a requirement, and this is the best way to do the job.

If you will notice in recent testimony, General Wickham has said that perhaps we have to look at other things, perhaps a new LHX is not the way to go. Maybe we want to have product improvement of our existing helicopters. All of those things should come out after careful study.

SMALL ICBM PROGRAM

I will give you another example regarding the small ICBM where by carefully analyzing the program hopefully we will come up with a much better program for the Nation, rather than rushing into it, go to DSARC--II in a hurry, and we are off and running. We have tremendous advocates every place, Service, in industry, and Congress, which makes it difficult to change anything once it gets going to that point.

POLICY ON TILT ROTOR PROGRAM

Senator STEVENS. My staff tells me the fixed-price contracts require Bell and Boeing to pay for two-thirds of the tooling. As a result, the total cost of the tilt rotor has gone down. This budget still reflects a postponement of tilt rotor. My question is your policy.

I remember looking at the need for wide-body aircraft. One of the reasons we have to have wide-body aircraft is that we have to be able to carry asphalt plants and things like that to put in airports if we have to go into areas where there are no airports. You do not need those if you have a tilt rotor that works.

It seems to me we are not coordinating the whole question of your cost consciousness in today's R&D effort and moving ahead on the ones that would really save us money in terms of defense dollars downstream.

Dr. HICKS. I think there is some of that there. I think we all share the guilt, Congress, Defense Department and industry. Industries press things they want to press, we press things through Congress, and Congress presses things through Congress. Everybody seems to have a hand in our priorities.

REQUIREMENT PROBLEMS

What we have to do is to try desperately, all of us, to work together. You are talking about the problems of requirements. I could not agree with you more. The biggest problem we have in weapon systems today is incomplete and inaccurate requirements.

Once you start out with a bad requirement, you immediately start out with a bad specification for a system and then you are off into a situation where you may be goldplating or you may be complying to a requirement that is not right in the first place.

In the general sense, I agree with you. I, myself, want to do the best I can to make sure any program that goes through DSARC--II, and there are a number of them now prepared to go through DSARC--II, has done an excellent job on the requirements so that the specifications that I see make sense to me.

REAL GROWTH IN R&D

Senator STEVENS. Let me shift my line this way. We have provided an air bridge real growth in R&D over the last 5 or 6 years somewhere between 11 and 12 percent. That has been a substantial rate of growth on a sustained basis.

Your budget this year would require 21 percent real growth from the line of available appropriations, post-Gramm-Rudman, and 11 to 12 percent I mentioned was on the previous year appropriation level.

So, if we look at this request of yours going in, it is $3-plus billion above what you could possibly reject as being available for R&D. It is not possible for us to contemplate a 21-percent real growth in appropriations for R&D.

PRIORITIZATION OF R&D PROGRAM

Let me get to the punch line. How do we prioritize your R&D program in view of the way you have presented it this year with these pulsing projects?

You reduce some that we were told last year were the most important and put in new ones this year that 2 years ago you wanted to leave out altogether. The C--17 you wanted to leave out 2 years ago. We kept it in as a research project. Now it is taking off like a sky rocket and others are being held back.

I do not understand the pulsing budgets in R&D right now.

Dr. HICKS. I agree that is bad. I also believe we are all responsible for it. We have to work together to stop it.

As Senator Nunn pointed out in one of his speeches recently on the floor, Congress has made impacts on 1,700 of the 4,500 line items the defense has. Most of those 1,700 line items are some of the most important line items there are. We are all involved in this prioritization. We as a group decide this thing.

I want to work with Congress. I want to make certain that we, as well as we can, have the right requirement to have specifications come out for a weapon system. I do not in any way defend pulsing budgets. I do not defend those things. They are wrong and there is something wrong when it happens.

LINE ITEM AUTHORIZATION

Senator STEVENS. I agree with Senator Nunn. The unfortunate part of it is that the Authorization Committees have not started to authorize line items. There are 22,000 line items in the budget before us. There are some 3,000 or 4,000 in theirs now.

There used to be only programs. Now we are getting down to the point where the authorization committee says if the line items are not within their key super line items, then it is not authorized. We are going to have that fight over 1986 before we get down to 1987.

You in the Department of Defense had better settle down for the fact you are going to get a defense bill after the election, the way things are going. We have a fight going on in the 1986 bill which I think is scandulous in terms of what is available as a result of last year's efforts in the legislative area and appropriations area.

PRIORITIZATION OF R&D BUDGET

I agree with Senator Nunn about the way it is tied up. That does not deal with the question I am dealing with and that is the prioritization of the R&D budget. It is not there on an ongoing basis, Dr. Hicks.

We do not see any continuity in these priorities. What was priority one or two or three in 1984 was not there in 1985 and suddenly it is back in 1986.

Dr. HICKS. Senator Stevens, all I can say is that in the next 3 years I will do the best I can to settle that problem. I agree with you it is not right. The inconsistency, sometimes comes from outside pressures.

We have to work together to find out what is the best thing for our country. There are a lot of problems with the acquisition process, and problems with the way that we get our programs.

On the other hand, we have some of the greatest weapon systems in the world. We have done an amazing job in the last 5 years to increase our capability vis-a-vis the Russians.

There are a lot more problems, I will be the first one to admit that. To the best of my ability, I will do what I can to rectify it.

Senator STEVENS. I have a series of questions and my good friend here from Wisconsin has some, too. Let me just ask one more.

JOINT SERVICE PROGRAMS

We have been trying to get joint Service programs. We had an arrangement with Dr. DeLauer 3 years ago and we tried to work on a joint Service acquisition program together with him. I understand that you are trying to pursue that, too. We would like to encourage you to do that.

ATF AND ATA PROGRAMS

I am told that the Air Force and the Navy have a memorandum of understanding about completed on the ATF and the ATA, advanced technical fighter and advanced tactical aicraft.

Are you involved in that effort?

Dr. HICKS. Yes, sir. My initiative started that. It should be signed within a week, and an announcement made by the Department.

I would like to explain that, if I may, because it is a little different than we have tried in the past. I think the reason we have had such lack of success in the past is because we have done it incorrectly.

We have had examples of the F–111, on things that did not work in the sense of one Service using the other Service's aircraft. The F–4 is an example where we did in fact have the Air Force use a Navy aircraft with minor changes initially in that aircraft in terms of the same wing, just lock the wing down, and so on.

F-4 AIRCRAFT PROGRAM

I made an analysis a number of years ago on that F–4 program in terms of if there had been, as the program was transferred to the Air Force, a development program of about $300 or $400 million at that time to essentially make that airplane into a much better land-based airplane, new wing, new structure behind the landing gear, and so on. It would have saved in the long run, in terms of lifetime cost, about $1.5 billion and would have given the Air Force a much better land-based F–4 initially. Through the years they continued to improve it.

What I am talking about here is on the ATF, for example, we want to have some Navy people work with designers of the ATF and in no way interfere with what the Air Force is trying to accomplish for their aircraft, but when there can be compromises made in the design, it does not hurt the Air Force's airplane, it will help later on to change the airplane for Navy use, it will be done.

Senator STEVENS. I hope you do that. That is the guts of the Packard Commission recommendation that I read over the weekend. It seems to me if we are going to get to the point where we can really eventually go off the shelf with a great many of these component parts, that you have to have some standardization between the Services to start with. That all starts in your court.

Dr. HICKS. Absolutely.

Senator STEVENS. We would like to work with you, if we can.

PREPARED STATEMENT

Do you have a statement to put in the record, Mr. D'Amato?

Senator D'AMATO. Yes, sir. Thank you, Mr. Chairman.

Welcome back, Dr. Hicks.

Dr. HICKS. Thank you.

PREPARED STATEMENT OF HON. ALFONSE D'AMATO

U.S. SENATOR FROM NEW YORK

Mr. Chairman, I want to thank Under Secretary Hicks for coming before this committee today to discuss the Defense Department's research, development, testing and evaluation funding.

Fiscal year 1987 will be a difficult year for defense programs. Although no one is certain how deep cuts will be in the defense budget, everyone agrees that some cuts will be necessary. I expect these reductions, unfortunately, to cut deeply into RDT&E programs.

One of the most important aspects of defense spending is RDT&E. Our national security depends upon our ability to stay technologically ahead of the Soviet Union. This is a challenge we must not neglect. The Soviet Union has invested heavily in its research and development programs, averaging about a 4-percent annual increase in such programs over the last 20 years. To complement this investment, the Soviet Union has ambitiously sought out, both legally and illegally, to acquire western technology.

Unfortunately, Moscow has been much too successful in this effort, especially with technology vital to U.S. national security interests. As the rash of spy cases this past year clearly demonstrates, the Soviet Union strongly concentrates on this clandestine form of research and development. When we say RDT&E, we use the letter "E" to stand for evaluation; the Soviets apparently use the "E" to stand for espionage.

One of the more important aspects of RDT&E is the modernization program for command, control, and communication program, or C3. Essential elements of our deterrent capability include our ability to communicate with our forces during peacetime and during all phases of conflict. The credibility of this deterrence depends on our ability to give clear and timely warning and evaluation of any enemy attack. Equally important is our ability to issue prompt strategic and tactical commands in retaliation. If our command, control, and communications systems are not reliable and survivable under stressful battle conditions, we lose much of our deterrent capability. The President has stated the need to improve C3 as a part of his strategic modernization program. Many of the RDT&E programs Congress has funded, such as our early warning radar and battlefield communications, already have improved C3.

I commend your work, Dr. Hicks, on command, control, and communications improvements, as well as your efforts on other important areas of the strategic modernization of our defense posture. Although the defense systems we now employ are protective in 1986, it is conceivable that such systems could become obsolete in a relatively short period of time through the advancement of technology. It is imperative that we continue to devote a significant portion of our defense budget to RDT&E. I look forward to working with you in the upcoming year.

Thank you, Mr. Chairman.

U.S./SOVIET TECHNOLOGY COMPARISONS

Senator STEVENS. Senator Proxmire.

Senator PROXMIRE. Thank you, Mr. Chairman.

Dr. Hicks, this is your publication "1987 DOD Program for Research and Development"?

Dr. HICKS. Yes, sir.

Senator PROXMIRE. I want to thank you. It is very helpful. Particularly the table showing the relative Soviet Union and U.S. standing in the 20 most important basic technology areas.

I notice that as of the latest report, that is on page 11-11, that the United States is superior in 14, the Soviet Union and the United States are equal in 6, the Soviet Union is superior in none.

I also notice, however, that of the five basic technology areas, in four of the five the Soviet Union is seeming to gain and we are gaining only in computers and software.

Is that correct?

Dr. HICKS. That is right. Actually our superiority is gaining, and they are getting better. We are getting more equal in the areas of materials and propulsion.

Senator PROXMIRE. It seems as though there has been, if anything, a little bit of an erosion from last year. Last year we were superior in 15. They were in five and they were superior in none. So, they are a little bit better off than they were before.

Why is this? This administration has been talking about, or they corrected the situation we had before and it was improving, it seems here we are not.

Dr. HICKS. I think we are improving, but they are improving more. In fact, I think a reasonable assumption to make is that as they come along, they become more and more mature in their technological base. They are going to require less and less of our technologies.

Senator PROXMIRE. They buy, borrow or steal it. We seem to pioneer in most of those areas.

Dr. HICKS. We pioneer in most of the areas. They are doing very well.

DIRECTED ENERGY LASERS

I was looking at directed energy lasers where it states that we are equal. We are equal in terms of understanding the problem. I do not know that we are equal in terms of having fielded directed energy lasers. There are a lot of indications they are further ahead than we are in that situation. SDI should correct that.

RESEARCH PERSONNEL

Senator PROXMIRE. One of the problems that bothers me about SDI was raised in another connection by Senator Hatfield about an hour or so ago in another committee. Senator Hatfield argued that the number of researchers we have in cancer will decline next year whereas the number we have in SDI will triple.

We go from 5,000 to 18,000 where in cancer we go from 5,000 to 6,000 down. It seems it is taking people out of medical research and putting them into military research.

What concerns us here is taking scientists and engineers who are in limited supply out of some of these other areas that are not affected by SDI into SDI and away from some very important technology areas.

In other words, as we pour more and more of our technological ability, limited scientists and engineers, into SDI, aren't we likely to lose ground in these other areas?

Dr. HICKS. I think that the kind of people involved in cancer research are quite different from those in SDI.

Senator PROXMIRE. They are.

Senator STEVENS. If the Senator will yield, I went into that last week. It is pretty clear a great portion of those involved in cancer research are going into research on AIDS. They have proven that cancer is caused by a virus. That came out of AIDS research.

I do not think it is fair to say we are transferring a competent scientific community to SDI. They are apples and oranges.

Senator PROXMIRE. I do not want Chairman Stevens and Chairman Hatfield to argue with. I want to concentrate on SDI.

DARPA CONNECTION WITH SDI

Dr. HICKS. I understand your concern. If you look at SDI, a large number of the programs that are in SDI really originated in our Defense Advanced Research Project Agency. That was, in fact, when the kernel of SDI started. That group moved out of DARPA into SDI.

The important thing about SDI, ignoring all of the arguments one way or the other about the ultimate situation, which will take us several years to pursue, it is an example I believe, of what can happen when we put large amounts of money, people, engineers and scientists, on programs that we are willing to take higher risks than we would otherwise.

For example, in the DARPA environment there is some risk because they do advanced research programs for the Defense Department. When they go into a program, they hope they will have a 50-percent chance of working.

We have gone into things, Senator, like the man on the Moon and nuclear weapons with a lot less percentage than that. In fact, this country was the first to really start using massive groups of engineers and scientists to attack a problem.

I do not think any of us can tell what is going to come out of SDI except I am convinced it will have a major impact.

Senator PROXMIRE. It may be a major impact. I am concerned about a major impact on some of our technology that may be more practical, more workable, more important than astrodome defense over this country.

DEPLOYED MILITARY SYSTEMS

On page 12, following that, you have another rather disturbing chart. It does show that we are ahead 16 to 4 in superiority on deployed military systems compared to the Soviet Union. It shows again we are slipping in 7 of the 16 where we are ahead.

Dr. HICKS. Yes. In all of those cases you see they are catching up because the technology is becoming available to them for whatever the reason. This happens from either internal actions or they have been able to get the technology from outside by spying on us or having access to it through other people.

Senator PROXMIRE. Let me interrupt to say the thrust of my question is whether or not the deployment of SDI as we approach that is again likely to absorb more resources and result in our deterioration in more of these other areas.

Dr. HICKS. I think that as it gets out of the research area and goes into the development phase, you will start to have a different kind of person involved. You will not find it diminishing our basic scientist and engineering talent.

COST OF SDI DEPLOYMENT

Senator PROXMIRE. At the same time, won't it result in enormous cost? Deployment is always more expensive than research.

Dr. HICKS. Absolutely.

Senator PROXMIRE. The cost of the SDI program under those circumstances is likely to be quite a challenge and drain to our more conventional nuclear——

Dr. HICKS. You have read, as I have, all of the various discussions about how much money it will cost. I do not think anyone knows for certain. It depends much upon what we find out in our research programs.

The SDI program is a research program, just that.

Senator PROXMIRE. My time is up. I have a lot of questions to ask, but I will wait.

Senator STEVENS. Senator Sasser.

Senator SASSER. Thank you very much, Mr. Chairman.

MULTIPLE/SINGLE WARHEAD MISSILE COMPARISON

Dr. Hicks, I want to echo the comment made by Senator Proxmire. I think this is a very useful document. I am just now getting an opportunity to look at it. I look forward to reading it from cover to cover. I think that will be a very helpful document. It supplies some very useful information.

Dr. Hicks, you have stated, as I understand it, correct me if I am wrong, that you believe a 75,000-pound multiple warhead missile is better than moving to a single warhead missile or procuring the 500 single warhead missiles.

Is this an accurate statement?

Let me just follow on and then let you say what you want to say.

Air Force studies that I have seen demonstrate that a single warhead missile is the most mobile and creates the greatest problem for Soviet defense planners.

I suppose my question to you is: Why do you differ with the Air Force, if you do, and is there information available to you that is not available to the Air Force when they draw their conclusions or do you simply come to different conclusions from the same information, which happens a lot around here?

Dr. HICKS. It happens all the time. Senator Sasser, I think there has been some misinterpretation of my position in the past versus the Air Force.

I never meant to say that the Air Force did not understand the problem. The baseline 30,000-pound missile, small ICBM, with its hard mobile launcher is on track and will continue on to the next DSARC milestone.

What I have said is that the alternatives to this baseline 30,000 pound, single-warhead missile should be thoroughly analyzed in detail. The data I have available to me is available to the Air Force.

STUDIES ON MISSILE DEVELOPMENT

The problem is that the Congress mandated in 1983 that the missile should not go over 30,000 pounds and it should have a single warhead. Because of that mandate, it is my belief that the Air Force has not looked into those other alternatives that they have access to as much as I do in detail except when directed by Congress to do so.

I have seen studies by Rand and others that have looked into some of these other alternatives. Let me give you some examples.

MISSILE WARHEADS

You have the baseline 30,000-pound single missile, single-warhead missile, 37,000-pound single RV.

Senator SASSER. Dr. Hicks, will you pull that microphone a little closer.

Dr. HICKS. Is that better?

Senator SASSER. Yes.

Dr. HICKS. A 40,000-pound single RV with penetration aids, a 45,000-pound missile which has two RVs, and finally a 75,000-pound missile with three RVs.

I have a responsibility as Chairman of the DSARC to make certain all alternatives are looked at carefully. It is my belief they have not all been looked at carefully. This program moved rapidly based on conclusions drawn after the Scowcroft Commission. Some of the things that came out of that total look at the Scowcroft Commission also said we were going to have 100 MX's.

To look at the total picture and try to decide what is best for us, we have to recognize that there may be significant dollar savings in fact if we go to the larger missile. The estimates of Rand were about $20 billion in terms of savings if we went to the three RV missile.

MISSILE VULNERABILITY

Let me correct one other thing that seems to be misconstrued by the press in terms of how it has been written up at least, and that involves vulnerability. The whole idea of mobility is that you go into a given area. Where you go in that area is unknown.

Since these hard mobile launchers of ours are able to withstand 30 psi, the Soviets in their attack have to cover the entire area with 30 psi over pressure since they do not know where you are in order to kill, the small ICMB to 90 percent. This is what they generally talk about in terms of some of their calculations.

Now, if I have 500 small ICBM's going into 8,000 square miles of area or I have 170 three larger RV, but still small ICBM's going into the same area, it is going to cost the Soviets exactly the same amount of effort to kill the 170 as it does to kill the 500.

So, the fact is that the three reentry vehicle warheads somehow are much more desirable targets is only true where you have a point situation and they know the point where you are. If they do not know where you are and they have to saturate the area, in the extreme, I could have 170 hard mobile vehicles that had 3 RV's on each one.

If they did not know where you were in that 8,000 square miles, they still would have to do the same thing and use the same amount of SS–18 force to destroy the missile.

So, there is no impact at all on survivability. The only issue is that if you cannot get out as far and cover as much area, if you cannot with that heavier, mobile launcher, move as fast, then you have a problem.

Saving $20 billion is a lot of money. It is my belief that we should look at all these things carefully. The Air Force will be required to look at them carefully before they come to DSARC–II later this year to see what is the most appropriate way to do this job.

I cannot believe we are so locked into a political situation at one point that if it turns out something else is just as good and saves us a lot of money, that we would not do that. That is all.

I do not have any need to want to go to three RV's versus one at all. It is a question of what is most efficient for us as a nation.

Senator SASSER. I think that is a plausible explanation. Let me shift gears for just a moment.

C-17 AIRCRAFT PROGRAM

You have a projection at the present time for the total cost of the C–17 program.

Dr. HICKS. I do not have that information in front of me, sir. I will provide that to you for the record.

C-17/C-5 COST COMPARISON

Senator SASSER. Can you give me any idea of how the cost of the C–17 program will compare with the cost of the current C–5 program?

Dr. HICKS. I cannot give you a specific comparison. I have been given briefings on both programs. The C–17 program is an excellent program in terms of efficiency and what it can do.

To make a comparison of that program with the C–5, I would rather do that for the record. I have seen it done, but to talk to you today about it off the cuff, I do not want to do that.

[The information follows:]

COMPARISON OF C–17 AND C–5 COSTS

The life cycle cost for the C–17A is considerably lower than that for the C–5B.

The estimated discounted 30-year life cycle cost for the C–17A is $197 million per unit (combining investment cost of $24,056 million for 210 aircraft or $114 million per unit, and operating and support (O&S) costs of $225 million per unit) in constant FY85 dollars, discounted at a real interest rate of 4 percent a year.

The estimated discounted 30-year life cycle cost for the C–5B is $234 million per unit (combining investment cost of $6,557 million for 50 aircraft or $131 million per unit—which is estimated to reduce to $82 million per unit if we were to buy the same quantity of C–5Bs as C–17As—and O&S costs of $363 million per unit) in the same dollars and discount rate.

It should be noted that both aircraft will have essentially the same intertheater cargo capacity (the greater number of flying hours per day possible for the C–17A compensates for the higher payload capability of the C–5B). Additionally, the C–17A has the capability of operating into certain airfields too small for the C–5B and can deliver more cargo per day to airfields of restricted ramp areas. Thus, the C–17A will be more effective than the C–5B as well as less expensive. These C–17A advantages are due to advances in design since the 1960s when the C–5 program was initiated.

CONSTRUCTION OF NEW STRATEGIC AIRLIFT

Senator SASSER. Let me say in the current budgetary climate I have some reservations about whether or not we can construct a new strategic airlift and move into a new strategic airlift program just at a time we are completing the old program.

What are your views on that?

Dr. HICKS. We are desperately short, as you know.

Senator SASSER. We need airlift, there is no doubt about that. We need sealift, there is no doubt about that. We have a lot of problems moving material, manpower, et cetera. Our resources are not infinite.

I have a real question as to whether or not, as I said earlier, just as we are completing one program for strategic airlift, then we embark on another.

Dr. HICKS. The number I have been shown for the C–17A, current year funding for 210 aircraft which will be completed by the year 2000 is $35.164 billion. As you notice in the Packard Commission report, there was discussion of taking our lift capabilities, air, marine, and so on, and putting that under one command to try to get that more efficient.

I am in favor of that approach, I believe it from just my own knowledge, in seeing operations, where we are very short on lift capability right now.

The question of whether we would be better off sticking to the old rather than going to the new and buying more C–5s, has been through a lot of effort in the Department of Defense to agree on what is the best situation.

I am convinced that the decision was made properly and the C–17 is the right airplane. I would be glad to go back into it in more detail myself again and brief you at a later date if you would like me to do that.

Senator SASSER. I suppose my concern is even if the C–17 is the right airplane, can we afford it?

Secondly, I frankly have some reservations about whether or not commanders are really going to risk taking a C–17 up close to the combat zone and putting it in on these primitive air strips as we are being told. I have doubts whether or not that will occur in a combat situation.

Dr. HICKS. I believe the specifications on the C–17 were much more carefully worked out than they were on the C–5. The C–5 had a lot of difficult design features for the contractor to meet.

I believe the C–17 specifications are much more realistic.

Senator SASSER. Thank you, Dr. Hicks.

Senator RUDMAN [presiding]. Senator Andrews.

Senator ANDREWS. Thank you, Mr. Chairman.

DENSE AROMATIC COAL DERIVED JET FUEL

Doctor, as you may know, in late 1985 this committee and the Congress appropriated for the Air Force some $4.5 million for research and development of a dense aromatic coal derived jet fuel.

It is the feeling of this committee this would extend the range of our operating military aircraft significantly and we felt and we have been told by the Defense Department this is extremely important.

My understanding is that the appropriation is currently held up and not yet processed by DOD for release to the Air Force. Furthermore, it appears likely we would expect additional delay in the program process through the DOD and Air Force bureaucracies.

Such delays were not what we had in mind when we proposed this jet fuel language because time is a critical element. I do not believe such delays were contemplated when the committee and later the Congress approved the proposal.

JET FUEL RESEARCH PROGRAM

The Air Force has a fuels research agency, Aviation Fuel Development Office, at Wright-Patterson Air Force Base. They have been working on this system for a long time. As a matter of fact, over the last decade or more they have used jet fuel in the SAW SAW Plan in South Africa to do research on. They have many of these findings already in hand.

Would it be possible for the DOD to designate the Air Force as an executive agent for carrying out the research program so that we can get on with this vital program?

Dr. HICKS. I really have no specific knowledge of the program. Until I look into it, I will be unable to give you a proper answer.

On the surface, the Air Force certainly is a good executive agency for programs. On jet fuel per se, it would seem to me that the broader implications indicate that perhaps the Department of Energy should be involved too.

I will look into that when I get back and give you an answer for the record.

[The information follows:]

COAL DERIVED JET FUEL

The Air Force is the executive agent for this specific program. The funds have not yet been released to the Air Force because they were not authorized by the Congress. As soon as we receive authorization approval, which we have requested, the funds will be released to the Air Force.

AIRCRAFT RANGE

Senator ANDREWS. The Department of Energy has, of course, conducted some work in this area, but the unique characteristics of high-density fuel flow to the need of the Air Force for extended range on its aircraft, particularly certain types of aircraft.

We want to move ahead with this research and do it as fast as we can. So, your expectation will be, and you are not totally familiar with it, that the Department of Defense could designate the Air Force as the handling agency for placing this particular contract?

Dr. HICKS. I would think so. However, I would like to reserve a final answer on that until I review the proposed program. The potential for high specific energy density in fuel is important. I will certainly look into it right away.

There is no reason, if it looks like a good program, why the Air Force could not be the executive agency. I do not know what the problem is, but I will find out.

Senator ANDREWS. Some of this borders on the classified. The important thing is to get this research underway.

COAL-BASED LIQUID JET FUEL/COAL-DERIVED JET FUEL

My second concern has to do with the fiscal 1986 appropriations bill as well. Contained in it is authorizing language for the Air Force to contract for a minimum of 10,000 barrels of coal-based liquid jet fuel at competitive market prices. There seems to be some confusion as to whether coal-based liquid jet fuel and coal derived jet fuel are one and the same.

Is there any question in your mind that the language "coal-based liquid fuel" and "coal-derived jet fuel" are the same?

Dr. HICKS. Frankly, I would not know the difference.

Senator ANDREWS. Since you do not know the difference, then the bureaucrats should not be assigning some kind of difference.

Quite candidly, what we are trying to do is get into the unique characteristics of coal to make a jet fuel that is higher density and find out what we need to know as rapidly as possible so that we can proceed with whatever potential there might be down the line.

Dr. HICKS. I will look into it.

Senator ANDREWS. We have been discussing it with people at Wright-Patterson. They are intrigued with it. They have been conducting this research for quite a while. They need the type of information that they can only get with the specific $4.5 million contract for research.

I would be interested in your looking at it personally and finding out what your evaluation is and how you can expedite it.

Dr. HICKS. I will look into it at once and report back to the committee.

Senator ANDREWS. Thank you very much.

Thank you, Mr. Chairman.

Senator RUDMAN. Thank you, Senator Andrews.

Dr. Hicks, we are going to have a few questions here and then I am going to adjourn the hearing.

CERTIFICATION ON AMRAAM

Dr. Hicks, to put it rather directly, those of us who have taken not-for-credit courses in weapons procurement, one course called Viper and the other course called DIVAD, are looking at the Secretary's certification on Friday on AMRAAM.

Frankly, it would raise eyebrows, because most of us do have some excellent sources of information, both within the Department of Defense, and the Air Force and the contractors.

From the language of last year's authorization bill, it seemed to me that the certification had indicated a number of things, and I do not think the facts that I have indicated have been reached. Yet we have the certification.

We are about to embark on a program that is not to exceed $5.2 billion for something like 17,000 missiles. This budget request is rather small, about three-quarters of a billion dollars. I say rather small; that would run the State of New Hampshire for a millennium. But three-quarters of a billion dollars for 260 of those missiles.

Do you think there is some possibility we may have a premature certification? Are you willing to come up here with all of your expertise, and I may bring some of mine, and discuss this whole issue?

Dr. HICKS. Yes, sir. I have been heavily involved in that program. As a matter of fact, I was involved in the program in terms of its conception many years ago in industry.

Senator RUDMAN. Nobody argues that we need it. We sure do need it. There is no argument about that. The question is about this particular system at this point.

Dr. HICKS. I have spent a lot of hours on that certification issue since I have been in the Department. If you look at the backup material to that rather single-page sign-off by the Secretary, I think it is a terribly honest look at the whole AMRAAM situation. It is the best possible look I think that honest people can give you about where the program is.

I personally would not have any problems certifying the issue that the Secretary certified. There are a lot of people who are very protective of the Secretary on issues of cost, in terms of caps in particular.

We went through a great deal of effort to make certain that everyone who could finally recommend to the Secretary that he sign this document have the necessary data. I am absolutely satisfied with the data that is available to us that that number is all right.

I am satisfied because of the information given to me directly by the contractors involved. Now, no contractor likes to sign up to things, but they have done that here. That is not to exceed kinds of cost.

The other issue that was part of this signoff was will the missile meet its requirements? Will it in fact meet the specifications?

I have no doubt about that. It is early in the flight test. We have not fired enough missiles. Obviously, part of the development program is to test what has to be fixed and fix it. That is a normal part of development.

COMPLICATED WEAPONS PROGRAMS

One of the matters that we have gotten into, Senator, which is too bad, is that we have very complicated weapon programs. They have complicated design features. The best people in our country are trying to make those things work. In the process of making those programs work, mistakes are made, not mistakes people want to make. They are a normal part of the development cycle. Something was not the way it should be.

So, you find that out in the test, go back and fix it and then go on to the next situation. I am convinced from the tests that I have seen of the AMRAAM today, that it can meet the specifications that we really want it to meet. It is going to be a fine missile.

Every missile always costs more than we like it to cost. But I am sure it can meet the cap. As you know, the Navy also plans to buy another 7,000 of those missiles and will benefit from that cost package.

So, I would say that I think AMRAAM and the certification was handled exactly right. I was heavily involved in it, myself, and feel comfortable with it.

DIVAD

DIVAD is another story, and I believe that it is a classic, too. I do not blame anybody again. We are all to blame. Congress has its blame in DIVAD just like the Army had its blame.

The problem there is that we started out with a requirement that was something they could meet with their original design. As time went on, new requirements came in. We now have a need to kill helicopters at 6 kilometers instead of 4 kilometers. It is really wrong to try to take a program and make it meet new specifications unless you have the growth in that program to begin with.

I think DIVAD was designed to fail on that operational test because no gun could reach 6 kilometers anyway.

On the other hand, we are now looking at a new area system for the Army. We have now decided, and I think rightly so, that it will take more than one weapon system to meet that full requirement.

Senator RUDMAN. That is exactly what the Army was told by the subcommittee 2½ years before.

Dr. HICKS. We will try not to make history repeat itself.

Senator RUDMAN. I have no reason certainly to doubt your sincerity or your judgment. You come from a very distinguished background, Dr. Hicks.

MISSILE TESTING PROGRAMS

The thing that bothers me is that my understanding is that about half of the missiles that were delivered, 20 originally, did have to be returned, and that the number of tests that were to take place, somewhere around 90, missed it by a large number.

Dr. HICKS. That will be 90 tests. It has not happened yet.

Senator RUDMAN. The certification that we asked for in the authorizaton bill, that Congress asked for last year, was based on an assumption, as to how these 20 missiles would work on a more extensive testing program.

It is my understanding that of the original 90 firings, according to the published report, I have some other information, but something in the area of 4 have been completed.

Is that correct? Do you think that is enough?

Dr. HICKS. It was a decision to put down a cap on that program. It was a decision over here to talk about certain certifications.

If you look carefully at what the Secretary said, he talks about the fact that we had four tests. Based on those four tests, we had excellent results. At this point in time we have had such success with the four tests, we know that whatever problems arise they can be fixed. If you want to say what would the Secretary do? We told him if he did not certify the program, you would kill the program. Now you say if you do not have 90 tests, you won't get certification.

Senator RUDMAN. I am in no position to make that judgment. I happen to agree with much of the Packard Commission report including comments on the Congress.

TESTING OPTIONS

Let me make the observation the Secretary certainly had another option. It was, in my opinion, not an option to certify or not certify and have the program killed.

I think a third option, which would have astounded many people here, but would have been accepted gladly, was a response that says: I am almost to the point where I can certify, but I still have problems. I do not want to commit to full production. I want an additional *x* millions of dollars to complete more testing. I would like to come back to you in 3 months or 6 months and tell you how that did because I want to be very faithful in my testing and I do not want to commit to production until I am sure we are 90 percent there.

On this committee he would have gotten overwhelming support.

Dr. HICKS. I recognize your point. That is one of the things we talked about. If we had had any real doubt that we had a missile system we were going to worry about, we would have done just that.

What will happen is that we are going to go through the rest of the test program. It will not be committed to production until it passes that test program. It will not go into production until the test passes essentially a two-sided test program, operational test program.

I do not think you need to worry about the fact that if something unforeseen, which nobody can foresee, ever came up, that we are going to produce this bird that is in trouble. We are not.

I am 99.99 percent sure that that will not happen. That is as sure as I am that I will get up tomorrow morning.

DSARC-III TESTING

Senator RUDMAN. You are saying this three-quarter of a billion dollars for initial purchase of 260 of those missiles, which is for production, is not being committed and production allowed to go forward until you have done enough testing to satisfy yourself?

Dr. HICKS. It will not go into full production until it goes into DSARC-III. There will be a pilot production period. You might find you can change an electronics card, which is less costly to produce and will still have the same connections and workings you would have from the previous cards.

There will be situations like that developed in every system that are designed to improve the production cost. When all of that is done and you have made that final test, then the decision is made to go into full-scale production, until that happens, it will not go into full-scale production.

TESTING REPORTS

Senator RUDMAN. Will the Department consider any kind of invasion of its executive decisionmaking authority and in the spirit of the Packard Commission report if the Congress were to say that we would like periodic reports on this testing before it goes into production?

Dr. HICKS. It would not bother me, sir. I am willing to give you production reports.

Senator RUDMAN. I would informally request that and I think formally I will request to the chairman that we do.

I am in no position to say the decision is wrong. I am not making that assertion this morning. I am expressing concern because of the nature of some of the systems we have dealt with. I have only mentioned two. You know there are many more.

Dr. HICKS. Let me make one point. That point is that I have zero desire to do anything but be open to Congress. There is nothing for me to hide. We are all Americans. We are trying to make better weapons systems.

We sometimes lose our way because of our own internal problems. I think a lot of the problems as discussed in the Packard Commission report or at least discussed behind the scenes in that report, are that there are things that happen because people get put in a position of protectiveness because they see such dire things happen during normal development situations.

Suppose you are developing a program and something goes wrong with the test. Ordinarily you would expect that in engineering and you fix it. Suppose that issue is taken by the press or by someone in Congress who wants to make an impact on that program, for whatever reason, and that happens.

Now, you have a generation of that, watch two generations of that and see what kind of manipulation we begin to have everywhere. What we all need to do is to try to cut through the manipulation everywhere, both here and in the Congress and the administration.

Senator RUDMAN. I appreciate that answer.

CHAOTIC SITUATION WITH OVERSIGHT

Am I correct that you were quoted publicly when you first took this job, saying that you were asked how you felt about the whole situation and how does it compare with private industry, and you said as far as you were concerned, it looked like anarchy?

Is that your quote?

Dr. HICKS. That is it.

Senator RUDMAN. What did you mean by that.

Dr. HICKS. I am saying there is a terrible fine line between personal freedom and anarchy. There is a very fine line between having oversight and having chaos. We have to give people responsibility for matters if we are going to hold them accountable.

It is just what we talked about earlier. If I am going to be responsible to make certain that I have done a good job in trying to prioritize defense systems, I can hardly be held responsible if in one-third of my programs I am told by Congress what to do, not to kill a program, or to add this, or subtract that.

Nothing to do with what I came over with. Here we have professionals who are in the job of management. We want professionals. Or if we do not want them, we should make all the decisions here and have administrators to carry out those decisions.

I do not say that is right or wrong. Congress is the law of the land. They can make any decision they want. I say that is not the way to get the job done. I think there has to be discipline in the Congress just like there has to be discipline in an organization.

Senator RUDMAN. When you said anarchy, I assumed you meant there was too much interference in a micromanagement way?

Dr. HICKS. That is also there. It is worse than that. What I could say is that this committee—micromanagement, I am not complaining about that—but you have specific oversight and it is your job. There we can negotiate to see how much you trust me to do the job right.

On the other hand, everybody in the Congress is trying to tell me what to do for their own particular personal reasons, preserve jobs in the district, whatever, that is what I call anarchy. That makes it impossible to do.

If I accept the fact, we have to live with that issue, everybody tries to make things go well for their own constituency, which is part of the democratic process, we do not need this incredible amount of oversight which makes that thing different.

INEFFICIENCY OF ACQUISITION PROCESS

The problem with the acquisition process is not waste, fraud and abuse. The real problem is inefficiency of the system that we have to try to attack.

Senator RUDMAN. I appreciate your comments. I do not disagree with them.

I just make a general observation that I think the situation has come about, from my observation over the years, both being here and before I came here, by the uncovering of some situations that were considered totally unacceptable and which members of Congress decided for a variety of reasons, some practical, some political, some other, that they wished to take on.

VIPER AND DIVAD SYSTEMS

Certainly the two systems I mentioned to you earlier, Viper and DIVAD, I have kept diaries on both of them day by day, of my own involvement, and Congress' involvement. Someday I will write about it. It is a very sad story.

If the Congress had not stepped into those cases, we would have a bunch of Vipers sitting in the warehouse with a shelf life of 6 months that did not work, a DIVAD that the troops relied on. In wartime you would have had a forward air defense that did not work. Troops would have thought it worked and it did not.

It is only because Congress stepped in that those systems were killed. I have great respect for you as I did for your predecessor. You both are frank and candid.

I think the best way to achieve what you are trying to achieve and get the Congress out of managing your business is to give us candor and make the tough decisions inside the Pentagon, do the things that have to be done in the Pentagon, because if you do not, somebody else will and they will start making decisions that they should not and make some wrong ones.

DIVAD

Dr. HICKS. Let us go back to DIVAD. Tell me the name of the person you can blame for the way DIVAD turned out.

Senator RUDMAN. I will after this hearing.

Dr. HICKS. Generally speaking, it is very hard to find out. The responsibility is diffuse because of the way the system works. It is hard to pin down the guy and say kill that person because he is no good.

Senator RUDMAN. I have a candidate, Dr. Hicks.

Senator Kasten.

Senator KASTEN. Mr. Chairman, thank you.

SURVIVABILITY OF BALLISTIC MISSILE SUBMARINE

Dr. Hicks, supporters of the ballistic missile submarine stress the survivability advantage. I understand that the survivability is degraded when it has to come near the surface to receive a message or command.

The Navy has been working back and forth on communication systems. One that is of interest to me is the ELF system, part of which is in Wisconson. I have a series of questions regarding this program and possible replacement.

STATUS OF ELF

First of all, what is the current status of ELF?

Dr. Hicks. Mr. Kasten, I have not focused on it. I know about the program. I have looked at it in the past and I have spent some time recently on the blue-green laser approach.

I cannot give you a good answer on that, but I will be glad to provide that information for the record.

[The information follows:]

Blue Green Laser System

The Ballistic Missile Submarine (SSBN) is the most survivable leg of our strategic "triad" and is expected to survive for months after an initial nuclear exchange. In order to insure that the National Command Authority retains the option of conducting a controlled and graduated response to a nuclear attack, we must insure that both the SSBNs and the supporting communications systems survive as long as possible. To ensure that the SSBNs survive, we want them to be free to operate throughout the ocean areas that are within range of their targets and throughout their depth and speed capabilities.

The Extremely Low Frequency (ELF) communication system allows the SSBN to operate over a greater range of speeds and depths than do existing land based or airborne Very Low Frequency (VLF) systems which require the submarine to come closer to the surface and/or to tow a bouy mounted antenna. However, since the ELF system operates at an extremely low date rate, it cannot complete the transmission of the necessary "Emergency Action Message" (EAM) by itself and serves primarily to enhance SSBN security in day-to-day, peace time operations. The development of the ELF system is essentially complete and with the completion of the Michigan transmitter site and receiver procurement, will reach its final operational capability in FY 1988.

ELF is a low technology, relatively inexpensive system whose costs are largely "sunk." To obtain greater survivability and to deliver complete EAMs, the Navy is investing heavily in a program to procure a replacement airframe for the airborne VLF relay platform known as TACAMO. When complete, the replacement airframe, called the E6A or ECX, is expected to extend communication survivability from a few hours to a few days if tanker support is available and if bases and logistic support survive.

The Satellite Laser Communication (SLC) system, formerly referred to as the Blue-Green laser system, is a high technology space-based concept [deleted].

The Navy has been interested in the concept of laser communications to submerged submarines for many years and has contributed to the joint Navy-DARPA technology development. In the congressional debate on the FY86 Defense Authorization Bill, additional money was added by one committee which did not appear in the final appropriation. Owing to unfortunate timing, the expected FY 86 increase was offset in the preparation of the FY87 budget. In addition, the FY86 budget debate in Congress and the coincident FY87 budget preparation in OSD resulted in the decision to invest several billion dollars in a new airframe for TACAMO. In the course of this debate, the Navy expressed preference for improvement of the existing EC-130 TACAMO coupled with some improvements to the communications equipment and continued investment in alternative communication system technology such as the STRATESEC) and SLC systems.

In view of the strong commitment to the TACAMO replacement airframe evinced by Congressional and OSD actions, the Navy has deferred plans to pursue a SLC system development until the period of heavy investment in the airframe is past. The recent progress in SLC technology has already prompted a revisit of the issues relating to the alternative means of satisfying our requirements for survivable strategic communications in Congress and within the Navy, and will, no doubt, bring about a review of our investment strategy as we build our FY88 budget this summer.

In summary, the Navy appreciates the progress that has been made in

SLC technology and the profound implication to both strategic and tactical submarine communications. However, the Navy is bound by previous decisions and current budget constraints to defer SLC developments after FY86. Until more effective submarine communication systems such as SLC and STRATESEC are developed and deployed, it is premature to speculate [deleted].

BLUE-GREEN LASER COMMUNICATION SYSTEM

Senator KASTEN. Let me make the point I was going to question you about. The Navy has been accused of dragging its feet in the development of the blue-green laser communications system because of the way it relates to the ELF system.

I have been a supporter of ELF. We have been successful in Northern Wisconsin in getting various county board groups and other local groups to come out in favor of, or I should say to not be in opposition.

Dr. HICKS. Which was a problem.

Senator KASTEN. Now, there are county board groups and other elected officials and appointed officials that are concerned. They went out there and did what they thought was the right thing to do, what they were asked to do by the U.S. Navy and the Government.

It was demonstrated how important it was going to be. It implied that a decision might be made relatively quickly.

I would like to know what kind of replacements are on the horizon, how important it is in your overall view and some comments on the delay or lack of progress on the blue-green laser communications system. It is all related.

I would like that information. Thank you.

Dr. HICKS. Let me answer part of that. We should not put all of our eggs into one basket. Even if we use the satellite system as a method of communicating with submarines, we would want one of the other systems as backup.

In the particular case of ELF, people are still thinking about blue-green laser which is one of the best penetrators.

I remember I was in a briefing with John Lehman when we were giving him the results of blue-green laser penetration and he said, "Well, I do not see anything difficult about that. All you have to do is to be in a submarine way down and look out the periscope until all you can see is blue light."

He is probably right. Despite all the scientific efforts we go to, sometimes a little common sense would have solved the problem.

Senator KASTEN. Mr. Chairman, I have a couple of other questions I want to submit for the record.

Thank you very much. I look forward to working with you.

Dr. HICKS. Thank you.

MX BASING OPTIONS

Senator **Rudman**. The last question. The Chairman would probably have asked this question had he been able to stay. It has to do with MX basing options. The questions are two.

One of the most serious candidates right now for basing options, follow-on basing and particularly which ones are farthest along in terms of technology and validation?

Dr. **Hicks**. I would like to make a general statement about MX, if I may.

MX is the least costly way that we can produce hard target killers for our deterrence. Even if they were only put in Minuteman silos with the vulnerability we all know exists there, they would still be a credible deterrent against the Soviet Union doing anything, I believe including first strike.

Now, we have been put in a position, because of the various compromises that took place after the Scowcroft Commission, of now having to find a different basing mode which is acceptable for the next 50 MX's. It has been said to me by a number of people, chairmen of oversight committees, and so on, that there is not going to be those second 50 MXs.

In fact, I was told by both the Chairman and everyone else that we are not going to get those second MX's. That it is politically impossible. That may be true. They have a much better understanding of the politics involved than I do.

That would be a real tragedy for the American people because we have an outstanding missile, extremely accurate, one of the best things we have ever built in terms of meeting its specifications and capabilities, it is also very low cost comparatively.

So, we need to fight to get the second 50 MX's. The statement was made to me: "I do not care what basing mode you come up with, it will not be acceptable." But that is not an honest answer because there are some acceptable basing modes.

MINUTEMAN SILO BASING

As I mentioned earlier, the MX basing mode in the Minuteman silo is acceptable in terms of making major deterrent impact. We are looking at several factors, one of which is super hard silos which have gone up someplace between 25 and 50 times stronger than so-called super hard silos in the past.

It calls for very accurate Russian ICBM's if they are going to cause any problem there. This does not say eventually that could not happen. When it gets to that point, you have the option of having an active point ballistic missile defense to again give you a leeway there.

CARRY HARD BASING MODE

We are also looking at "carry hard" which is a deceptive kind of basing mode. It has possible cost problems. We are going to get to the bottom of that. We will test this year across the board to see where we are in terms of the cost issue on "carry hard."

SHALLOW TRENCH BASING MODE

We have another deceptive mode called "shallow trench" which looks very good, too. It looks like it will be more costly. We have, in my mind, excellent places to put MX and I would hope that looking at the cost issue and what makes sense to us in terms of deterrence, which is what we are looking for, that we will continue to pursue the second 50 MX's.

Senator RUDMAN. Dr. Hicks, I see that our ranking member is here, so I will now yield to Senator Proxmire.

Senator PROXMIRE. Thank you, Mr. Chairman.

U.S.-ACQUIRED TECHNOLOGY BY SOVIETS

On page 11-16 of your report to the Congress on the DOD program for research and development you list five negative effects of the Soviet Union and its allies acquiring military technology.

First, it will save the Soviets billions of rubles.

Two, it reduces their weapon system procurement times.

Three, it enhances the productivity of their defense industrial base.

Four, it reduces engineering risks in their weapons development.

And, five, enables them to develop more effective rsponses to western weapons and tactics.

The President has proposed to share our Star Wars with the Soviets. That was his initial proposal. He has made an open lab proposal on Star Wars.

I am correct in concluding sharing Star Wars technology with the Soviets would have the same five negative effects you have listed with the Soviets gaining on our technology and would not it save them millions of rubles in developing Star Wars, and so forth?

Dr. HICKS. If we gave them the entire capability, it certainly would.

I think the President's view was that if we really had a shield in order for them to feel they did not have any more of a threat than we had, that we would make that available to them so that they would not have to worry about a first strike from us any more than we had to worry about a first strike from them.

Senator PROXMIRE. The Secretary made the point if we gave them the technology, it would greatly improve the prospects that they would have of penetrating technology.

Knowing, as you know, in military, technology is static; it is dynamic. Certainly if they had access to the entire technology, would not it mean they would be able to develop a means of penetration that would nullify its effectiveness?

Dr. HICKS. There is no doubt that it certainly would make it easier for them to contemplate that. We are talking about things that are going to be done a long time from now.

Today we are very protective of important technologies in SDI. We have a number of things going on that are very secret. A decision has not been made as far as I am concerned in specifics to release that to anyone who would benefit, as our enemy would, with that data.

I am not competent to talk about the philosophical judgment of whether we should be giving SDI as a finished system to the Russians in terms of both of us having a shield. There is no doubt that when you give somebody your technology, he learns things that help him to step up from there. There is no question about it.

ALLOCATION FOR NEW RESEARCH CENTER

Senator PROXMIRE. Recently the Congress acted on the allocation of $12 million to Syracuse University on a noncompetitive grant for a new research center. I thought it was outrageous. I see no excuse for evading a system that is set up to provide the top expert independent quality advice we can get. Once you do that, I do not see where you draw the line.

What is your position on that kind of allocation?

Dr. HICKS. I will probably be in terrible trouble for saying this, but I totally agree with you. My belief is that we have a good way of allocating funds to universities. We use DOD need, real need, as a criterion and we have extremely fine people who, with their peers evaluate the projects. Peer judgment is the way I like to see these things done.

It is akin to having honest competition and honest evaluations. I had a meeting at the National Science Foundation when this subject came up with some of the Congressmen involved. I pointed out to some of the university presidents that they were facing something that was not at all new, that if you were a defense contractor, you would recognize this was part of the requirements that you would have to do.

UNIVERSITY LOBBIES

What is going to happen here is that we are going to have a new lobby. This will be the lobby of the universities just as we have a lobby for everything else for the Congress, to try to get their cut of the deal.

When Congress does that to that particular thing, which is sort of our last mass communication of whatever we really are asking for, that last bastion to start the same lobbying for their part of the budget, we have and do not allow the right competition to take place.

One argument that I heard that may have some merit, but you have to be careful. The one argument I heard was, that small schools someplace in the Southwest, feel they are not part of the old boy network and they do not get the right evaluation by their peers and this is the only way for them to obtain such funds.

Basically, I think we can see historically that we have a very honest way of sending out our funds.

In fiscal year 1986 we have $65 million that we are told specifically where to give it and how much. I might add that the schools cannot even handle it. They cannot grow that fast. They cannot spend money as fast as the amount of money allocated to them.

Senator RUDMAN. You just want to insert something in the record at this point, lest anybody read biographies and draw erroneous inferences?

I am a graduate of Syracuse University. Senator Proxmire objected to the award at the subcommittee level. I supported Senator Proxmire. Senator Proxmire brought it before the U.S. Senate. I supported Senator Proxmire as the Senator will recall.

I agree with you completely. I think that in other areas probably the Congress, due to some problems we have seen in the award of these things, might step in and do something different. But not in the defense area.

So, I just want to make sure the record shows that point lest somebody read that and assume I was the father of this particular travesty.

Dr. HICKS. It did not even cross my mind, Senator.

Senator PROXMIRE. I want to say to the chairman of the subcommittee, acting chairman, now Senator Rudman, is a marvelous Senator. This is an example of his excellence. Anybody who can put any values higher than his values to his alma mater cannot be all wrong.

CORRESPONDENCE FOR THE RECORD

(CLERK'S NOTE: The Chairman received the following correspondence from the Henry M. Jackson Foundation in support of initiation of Federal funding for a National Center for U.S.-China and Northeast Asia Relations):

THE
HENRY M. JACKSON
FOUNDATION

May 20, 1986

The Honorable Ted Stevens
Chairman
Subcommittee on Defense Appropriations
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

My continuing interest in strategic affairs coupled with my service over the past three years as a member of the Board of Directors of the Henry M. Jackson Foundation has spotlighted a significant deficiency in U.S. higher education that merits Congressional review. I bring this matter to your attention because it has potentially serious implications for our national security and because of your long-standing interest in U.S. relations with the countries of the North Pacific region.

The major purpose of the Henry M. Jackson Foundation is to carry on the late Senator's lifelong commitment to encouraging international order through an informed and realistic understanding of the history, culture and language of other nations. Senator Jackson firmly believed that international stability required that governments of the U.S., China and the Soviet Union each develop a capacity to communicate effectively despite their immense differences in culture, language and strategic objectives. The Jackson Foundation is helping carry forward the Senator's concerns in this area by funding special programs at the Henry M. Jackson School of International Affairs at the University of Washington and at other institutions. The members of the Foundation's Board share Senator Jackson's belief that the U.S.-Sino-Soviet relationship is key to future world stability and to expanding personal freedom. We also believe that future generations of our government and military leadership should be knowledgeable in the language, history and culture of China and Russia and in the history of Sino-Soviet relations if they are to successfully manage U.S. interests in the tripolar relationship.

This background brings me to the significant deficiency in U.S. higher education I noted above. In spite of the critical importance of China and Sino-Soviet relations to the most vital interests of the U.S. and to international order, the level of private and public support for Chinese studies in this country is very uneven and alarmingly low. Japanese and Soviet studies, on the other hand, have enjoyed significant priority support from major foundations as well as from governmental, corporate and private sources. The Jackson Foundation, with income from a small endowment and pledges of approximately $3.5 million, is making an important effort to fill part of the vacuum that exists in Chinese studies at one of our nation's finest schools of international affairs. It is clear to me, however, that the urgent need for funding programs for Chinese studies far outstrips the limited resources of the Foundation, no matter how well the Board targets these resources.

There are, of course, no easy answers to this problem at a time when there is intense competition for charitable donations and for funding of Federal programs. Furthermore, recognizing the relevance and importance of Chinese studies to critical U.S. interests requires a level of sophistication and background that is not commonplace. Funding for Chinese studies has been and continues to be a fundamentally important objective for the U.S. because of its potentially profound implications for the world's security and for our national defense. In my view, this subject merits your Subcommittee's attention and oversight.

I am enclosing two papers prepared by staff for the Jackson Foundation which provide more background on the state of Chinese and Northeast Asian studies and which review some of the options available for addressing this matter.

Sincerely,

James R. Schlesinger
Member
Board of Governors

Enclosures

A Paper Prepared by the Henry M. Jackson Foundation Staff

PRIORITIES IN AREA STUDIES IN U.S. HIGHER EDUCATION: THE CHINESE STUDIES PROBLEM

The funding of area studies in higher education in the United States is very uneven. Funding has been subject to trends in popular thinking and to the vagaries of foundation priorities. Most commonly, the direction and level of effort depends on and is responsive to crisis situations.

I. Japanese Studies

Support for Japanese studies in the United States has been and continues to be abundant. Each time in the past decade that Japan-U.S. relations have reached a point of crisis, the Japanese government or major Japanese companies or financiers have established new foundations to improve our understanding of Japanese culture, institutions and aspirations. Thus in 1973, the quasi-governmental Japan Foundation made $1 million endowment gifts to ten American universities. Later, at a cost of approximately $40 million, the Japan-American Friendship Commission was established by the U.S. Government. More recently, the Japanese financier, Sasakawa, established the U.S.-Japan Foundation with a $40 million grant. Subsequently, the Matsushita Corporation announced a $10 million Matsushita Foundation to be chaired in New York by former Ambassador Robert Ingersoll. Most recently, the Hitachi Corporation also established the Hitachi Foundation to fund educational projects related to Japanese Studies.

II. Soviet Studies

The Averell Harriman Institute for Russian Studies at

Columbia University was recently funded with an $11 million gift from Ambassador Harriman. The Rockefeller, Mellon, and Ford Foundations have also made major grants to support Russian studies at several universities. Above all, the Federal Government has recently made an impressive commitment. The Soviet-East European Research and Training Act of 1983, Title VIII of the Department of State Authorization Act, provides for up to $5 million a year for a 10-year period to support graduate training, advanced research, public dissemination of research data, and overseas study of American specialists on the Soviet bloc countries. This major new infusion of federal funds for the Soviet studies field has greatly strengthened university programs and such national institutions as the Kennan Institute for Advanced Russian Studies at the Smithsonian.

III. Chinese Studies

In the field of Chinese studies, however, there have been no comparable foundation, government, or corporate initiatives to provide future generations of Americans with the expertise in Chinese affairs that we are obviously going to need to deal with one-quarter of mankind. The Chinese Government clearly cannot afford the foreign exchange even to contemplate the kind of gifts that are regularly made by the Japanese.

It is highly significant, however, that the Chinese have made three recent gifts to the Henry M. Jackson Foundation. They were small, to be sure, but are indicative of the appreciation that the Chinese feel for an American statesman who perceived the importance of and worked to improve the U.S.-Chinese bilateral relationship. In turn, the Jackson Foundation has funded a number of significant special programs in Chinese studies at the Jackson School of International Affairs at the University of Washington.

IV. Federal Funding for Area Studies

In the past, Congress has made special appropriations for the Hubert Humphrey Institute at the University of Minnesota and for the Mike Mansfield Center for Pacific Affairs at the University of Montana. It has provided funding for buildings for schools of international affairs at Georgetown and Tufts and has provided critical funding to initiate a wide variety of other programs to improve international relations. These efforts have not, however, filled the vacuum that exists in Chinese studies in this country.

V. One Option

A number of knowledgeable observers who have expertise on the importance of Chinese studies to the effective and on-going management of the critical U.S.-Sino-Soviet relationship feel that this situation must be remedied. One remedy would be for the Federal Government to initiate and fund a modest program in Chinese studies. Such a program could serve as a catalyst, a small critical mass, in attracting private sector and foundation funding for this vitally important field of study.

A Paper Prepared by the Henry M.
Jackson Foundation Staff

A NATIONAL CENTER FOR U.S.-CHINA AND NORTHEAST ASIA RELATIONS

I. Northeast Asia: A Strategic Region

Northeast Asia is a key strategic region, vital to United States global interests and to the maintenance of world peace. Only in this critical region do American interests directly interact with three other major powers: Russia, China, and Japan. The roles that these countries adopt on the Asian land mass and in the Pacific are critical to the preservation of a favorable balance of power. The Soviet Union presently devotes roughly twenty-five percent of its military effort to the Far Eastern theatre. It is rapidly expanding its strategic presence in the Pacific and is clearly determined to become a great naval power in this region. Its relationship to the People's Republic of China, with which it shares a 4,500 mile border, is fundamental to the geopolitics of this region. China's economic development and its strategic policies represent a long-range challenge for the Soviets; and the state of Sino-Soviet relations is of continuing importance to American strategic planning. The international politics of the Korean Peninsula is a focal point of the relations of the powers in Northeast Asia. Japan's immense technological and economic strength is of great potential significance to the economies of the region.

II. The Significance of China's Emergence

China, comprising a quarter of mankind, is now in the midst of joining the world community. The new Chinese leadership has grasped the reality that we live in an era of increasing interdependence and no nation can attain economic development or security by remaining aloof from the world. Neither China nor the world community will ever be the same as a result. The necessity of including China in the search for solutions of international problems will become increasingly important. For example, China's inclusion in international financial institutions such as the World Bank, the IMF, and more recently the Asian Development Bank will make her an important participant in the approach to international financial issues. China's foreign trade has more than tripled between 1978 and 1985. China is now as oriented toward the international economy as is the United States. China will also become a significant participant in many other international issues: environmental control, the proper use of the seabed and space, and, above all, arms control agreements.

III. The U.S. National Need

For the United States, the development of cooperative relations with the People's Republic of China is of immense importance to our future. We will want to work together effectively to develop solutions to the many international issues where our interest overlap. "How effectively we manage our relations with China," Senator Henry M. Jackson said, "will be a key to peace for the remainder of this century and on into the next." Moreover, the competition for shares of the China trade will be intense and the countries that have not only the most competitive products but also the best knowledge of China, its economy and its institutions, will be in the most advantageous position. In short, effective development of strategic and commercial relations between the U.S. and China will depend in significant ways on the capacity to fully understand Chinese institutions and aspirations.

IV. Need For An Institutional Approach

Despite their key strategic roles and importance for the American future, the United States has no national center for the study of its relations with China or with the other important countries of Northeast Asia. There is no concerted effort to organize research on the critical issues of the political, strategic, and economic relations of the United States with China or with Northeast Asia as a whole. Nor is there any concerted effort to train and develop the future expertise so critical to understanding this region. Senator Jackson and, now, others following in his tradition, are of the view that future prospects for peace depend heavily upon the wise management of American relations with China and the other countries of Northeast Asia. Prior to his death in 1983, the Senator was deeply concerned that we have too little expertise in the field of Sino-American and Sino-Soviet relations. Little has happened in the interim to relieve this critical concern. The need to monitor and understand the relationship of China and the Soviet Union and other Northeast Asian Nations is one of the most pressing aspects of foreign policy and strategic planning facing the U.S. today.

V. A National Center for U.S.-China and Northeast Asian Relations

To meet the needs of a closer cooperative relationship with China, we should, as a nation, greatly expand our training of expertise on China and Northeast Asia. We need to institutionalize and promote advanced research and training in the fields of the political, strategic, and economic relations of the United States with China and the countries of Northeast Asia. We need expertise not only in academia but in business, law and, most important, in government. For this purpose, a national center for U.S.-China and Northeast Asian relations at a university with a long and strong tradition of Chinese and Asian studies would be an asset of incalculable value to this country. Such a center would require funding assistance for the following functions:

1. Facilities for visitors, researchers, seminars and conferences; for satellite reception of Soviet and Chinese television; and for transmission of conference programming.
2. Support for permanent faculty, visiting scholars and researchers; and fellowships for graduate students.
3. Conferences, seminars, and short-term courses for members of the government, academia, and the media from the countries of this region.
4. Faculty and student exchange programs.
5. Career and mid-career training programs for officials of the Federal government and for our military leadership, with emphasis on strategic relationships and management of the U.S.-Sino-Soviet tripolar relationship.
6. Mid-career training programs for professionals in business, law and journalism whose activities have come to involve China and Northeast Asia.
7. Conferences to bring together experts on China and Northeast Asia for intensive discussion of issues in our relations.
8. Training graduate students in various disciplines of Chinese and Asian studies.
9. Intensive language training during the academic year and the summer, with the ability to attract students from around the world.
10. Support for publications.

EFFECT OF GRAMM-RUDMAN ON DEFENSE BUDGET

As you know, Senator Rudman is also a principal author of the Gramm-Rudman bill which will have an effect on your agency as it does on all others. I know the Chairman has a strong view on this. If the Gramm-Rudman sequestering goes through, what effect will it have in 1987 on your resources and your ability to serve our national security interests?

Dr. HICKS. A lot better people than I in the administration have asked that question. If this Congress adheres to the President's budget, we do not have to worry about that.

DARPA RESEARCH

The second thing is I can go to 1986 and tell you what happened in 1986. It cost DARPA, for example, about $70 million out of its $800 million budget.

So, we had to cut back on some extremely important research in DARPA. The Defense Nuclear Agency had the same problem because we had to protect manpower and SDI.

Senator PROXMIRE. It will be a lot more severe in 1987.

Dr. HICKS. It will be a lot more severe in 1987 if the Congress does not support the President's budget. I have to say that I cannot believe that this body of intelligent men with the kind of incredible problems we are facing with the Soviet Union and the need we have for strength, regardless of all other issues, will eventually let the defense budget get reduced as much as I have seen analyzed——

Senator PROXMIRE. I agree with that. We cannot take anything for granted.

EFFECT OF $40 BILLION IN DEFENSE BUDGET

What effect will it have? Will it have a serious effect on national security? Can you tell us that as Under Secretary for Research and Development?

Dr. HICKS. You tell me the amount of money it will mean. Suppose we use the $40 billion which I have heard, it will have an incredibly bad effect on defense, there is no question about it.

Senator PROXMIRE. On your particular department?

Dr. HICKS. Absolutely, on everything, manpower, readiness, R&D and production.

Since 1975 to 1985 when the Soviet Union crossed over, in that period, they spent $200 billion more than we spent. We are on the same path now. It has not changed. If we go back and do that again, we are in real trouble.

I cannot imagine us, recognizing what the Soviet Union really is, letting that happen.

Senator PROXMIRE. I agree with you wholeheartedly on this. I voted for Gramm-Rudman. It was absolutely essential. We had to do it. As Senator Domenici said, it is what is called a planned train wreck. If you know there is a train wreck coming, you do something about saving your life.

In the same way we have to do something if we know the consequence of avoiding sequestration.

Dr. HICKS. I believe that is right.

Senator RUDMAN. I will say to my friend from Wisconsin I am not sure the analogy is apt. If you are planning a train wreck, we should get off the train. We do not have that option.

My very good friend from Wisconsin is absolutely right, your answer is correct. I would put the question differently. I would not put the question if the Gramm-Rudman-Hollings works.

My question is: What happens if the Congress does not work. If we do not make those choices, a lot of horrible things will happen. If it does not work, there will be a lot of new faces around here and that will be for the positive.

SUBMITTED QUESTIONS

Committee members have additional questions which we will submit for your response.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

Questions Submitted by Senator D'Amato

MINE-SWEEPING CAPABILITIES

QUESTION: There has been some criticism of the Navy's strategic homeporting program because of our inadequate mine-sweeping capabilities. Could you comment on this criticism? How are we progressing in our efforts to modernize our mine-sweeping capabilities in light with Soviet advancements in this area?

ANSWER: The MCM/MSH ship and AMCM aircraft construction programs resulted from decisions made following review of the MCM concepts 85-90 Force Levels Study. The study was also the basis for the determination of numbers of ships and aircraft needed, as well as where they should appropriately be homeported. An MCM Concepts 95 Study was directed in 1984 in order to again assess needs based on the threat and strategic homeporting changes. These projections have shown that programmed force levels are adequate within funding limitations to meet the threat to strategic homeporting, although sequential clearance may be required. The results of that study are expected later this year. [Deleted].

Questions Submitted by Senator Stennis

TRIDENT II MISSILE REDUCTIONS

QUESTION: The Gramm-Rudman-Hollings sequester order for 1986 reduced TRIDENT II development funding by approximately $116 million. Considering the priority of the TRIDENT II program, why did the Administration choose not to protect TRIDENT funding from cuts?

ANSWER: The selection of protected programs under the Gramm-Rudman-Hollings sequester order was not made on the basis of priority, since each has survived critical executive and legislative branch scrutiny and is integral to achieving and maintaining a balanced warfighting force. Rather, programs were protected which if reduced would be economically disruptive.

QUESTION: Can you still make the 1989 IOC after taking this $116 million cut?

ANSWER: It is anticipated that stringent management actions will permit the funding of all efforts necessary to keep the missile program on schedule. Given the very tight execution schedule anticipated in FY-1986, it is most important that the FY-1987 program be approved at the requested level to ensure maintenance of a very tight overall schedule.

AIRSHIP

QUESTION: I notice the Navy has a new start to develop a lighter-than-air airship with a large radar to use in a fleet defense role. The Navy used many blimps for convoy protection during the Second World War with success. Would you explain a bit more about their proposed use at this time? Also, what do you estimate would be the cost to develop this capability to reach the point of operational capability?

ANSWER: The primary functions envisioned for the Naval Airship are to: (1) Provide for over-the-horizon (OTH) detection and tracking of low observable ASMs, including those flying at high speed and low levels in a jamming environment; (2) Provide facilities to interface with surface missile systems in the directing of weapons against air threats; (3) Serve as a communications relay to permit dispersed fleet elements to use low probability of intercept line-of-sight communication frequencies; (4) Provide OTH detection, identification, and targeting for offensive weapon deployment against hostile shipping and land targets; and, (5) Provide backup direction for friendly sea- and land-based aircraft for intercept or general vectoring.

In regard to the primary mission outlined above, a low frequency, large aperture radar is required for long-range detection of low-observable targets. The airship is the only platform which can accommodate and operate such a radar while continuously deployed with surface forces. The extremely long endurance of an airship allows it to remain within the defensive umbrella of surface combatants throughout their deployment. Operating costs are relatively low, and airships can be supported from numerous surface ships.

The collateral functions of this system are to: (1) Assist in the search for ASW contacts through the monitoring of sonobuoys and A^2 deployable arrays; (2) Offer search and rescue (SAR) and plane guard service; (3) Provide ESM surveillance and active jamming for fleet elements; (4) Provide cover and deception services for surface fleet elements; (5) A Long Endurance Airborne Area Surveillance System has the potential to provide threat warning and attack assessment (TW/AA) of enemy submarine-launched cruise missiles, thereby contributing to the strategic defense of the CONUS.

Estimated cost for full program development of two prototype airships through technical and operational evaluation is $450M-$800M, depending on which development and acquisition strategy is pursued.

QUESTIONS SUBMITTED BY SENATOR INOUYE

FUNDING FOR THE GROUP PSYCHOLOGY PROGRAM AT ONR

QUESTION: The basic research program in small group processes in ONR's Psychological Sciences Division has had a budget reduction from $1.25M to $250K in FY86, and a proposed budget of $250K in FY87. Have research priorities been changed? What mechanism, if any, will be used to ensure that high quality research proposals on group processes will receive support in the future?

ANSWER: Research priorities have been changed somewhat, to meet new scientific opportunities. The decision to reduce the Group Performance research program was made after merit review of the most recent set of social psychology research proposals found them to be inappropriate for the scientific thrusts the ONR is now seeking to support. The ONR is maintaining a critical nucleus of research in group psychology with $250K in FY86 and planning a continuing small investment in response to proposals of excellence.

QUESTIONS SUBMITTED BY SENATOR HATFIELD

PERCENTAGE OF BUDGET TO UNIVERSITIES

QUESTION: Mr. Hicks, what percentage of your FY 87 RDT&E budget will be performed by universities and how many dollars does that represent?

ANSWER: The nation's universities are to be allocated 3.7%, or $1550.6 million, of the FY 87 RDT&E budget.

INITIATION OF NEW RESEARCH CONTRACTS AT UNIVERSITIES

QUESTION: What percentage of the nearly $1.3 billion RDT&E dollars to be issued to universities in FY 86 will be to continue existing contract awards, and how much to initiate new research contracts?

ANSWER: University contract awards typically support research efforts which run for about three years, so that on average, one third of the funds supports new work.

COMPETITIVE AWARDS TO UNIVERSITIES

QUESTION: Of the new contracts issued to universities in FY 86 what percentage will be awarded through competitive procurement; merit review and/or sole source contracting?

ANSWER: All basic research (6.1) contracts to universities are procured competitively from universities responding to the "Broad Agency Announcements" issued annually by the Service research offices. All proposals are thoroughly reviewed for scientific and technical merit by highly qualified scientists and/or engineers before they are considered for funding. We also support research at some university centers, such as the Applied Physics Laboratory (APL) at Johns Hopkins University and the Army's artificial intelligence centers of excellence at the Universities of Texas and Pennsylvania. With few exceptions, APL being one, research at these centers is competitively bid. Finally, a few large university operated Federally Funded R&D Centers (FFRDC's), such as MIT's Lincoln Laboratory, which are funded mostly out of R&D budget categories 6.2 through 6.4 and are treated like other FFRDC's.

MERIT REVIEW FOR UNIVERSITY RESEARCH PROPOSALS

QUESTIONS: Please describe the merit review process used by DoD/RDT&E for reviewing university research proposals, for example: is there a single, permanent review board or is a separate board selected to review each solicitation? How many merit review boards are formed in a given fiscal year and how many members serve on those boards? How are those members selected and do they represent government, industry or educational institutions? Has the merit review process, or the boards, ever been studied, reviewed or investigated by the DoD Comptroller General or any other similar independent assessment agency?

ANSWER: Review panels for university research proposals may be selected by broad technical areas to review many proposals, or specifically for evaluating large programs or centers proposed in response to a particular solicitation. In a given fiscal year, one directorate may form 5 to 6 panels for some broad discipline area. Members are drawn primarily from universities, with participation form government and industry as well. There has been no audit or investigation of these panels by the DoD. However, periodic in-depth topical reviews by university, industry and government experts of the research in a given field provide a self checking mechanism for the quality of the merit review process.

UNIVERSITIES RECEIVING DOD RDT&E CONTRACT AWARDS

QUESTION: Please list the universities which received DoD/RDT&E contract awards in FY81-FY85, their funding levels, and percentage compared to the total dollars issued to universities in that fiscal year.

ANSWER: Listings for universities receiving DoD RDT&E contract awards, and their funding levels from FY81-FY84, are included in the attached documents. Data for FY85 is not yet available. Note that the figures for FY81-FY82 and FY83-FY84 are for prime contract awards over $10,000 and $25,000, respectively.

From FY81-FY85, universities received approximately 3.7, 3.7, 3.9, 3.8, and 3.7 percent, respectively, of the total DoD RDT&E budgets.

Department of Defense

EDUCATIONAL AND NONPROFIT INSTITUTIONS RECEIVING PRIME CONTRACT AWARDS FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Fiscal Year 1981

Issued Annually by

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FOREWORD

Educational and Nonprofit Institutions Receiving Prime Contract Awards for Research, Development, Test, and Evaluation is published annually by the Office of the Secretary of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (WHS/DIOR).

This report provides information on Department of Defense prime contract awards to educational and nonprofit institutions during Fiscal Year 1981. These data are shown in three sections, organized by awards to:

1. Educational and nonprofit institutions within the United States;
2. U.S. government agencies; and
3. Foreign institutions and government agencies.

Requests for additional information should be addressed to the Director, Washington Headquarters Services, Room 3E843, The Pentagon, Washington, D.C. 20301. The contents of this publication may be reproduced without permission.

INTRODUCTION

This report presents data on Department of Defense (DOD) prime contract awards over $10,000 for research, development, test, and evaluation (RDT&E) made to educational and nonprofit institutions during Fiscal Year (FY) 1981. The data are presented in three tables, each of which lists contractors alphabetically and gives the net value of all awards to the contractor as well as the value of the awards to each of the contractor's locations, where applicable. Table 1 covers awards to educational and other nonprofit institutions in the United States, Table 2 covers awards to U.S. government agencies, and data on awards to foreign institutions and government agencies are provided in Table 3.

NOTES ON COVERAGE

The dollar amounts shown here include prime contract awards over $10,000 for RDT&E work only. Data on awards for other services, such as training, and on any supplies furnished by the contractor in support of research being done are excluded. Since FY 1980, contract awards for civil functions have been included in these data. (Civil functions encompass planning, programming, designing, constructing, and operating Federal water resource projects for navigation, flood control, hydroelectric power production, water supply, and other-related activities.) The data prior to FY 1980 were limited to military prime contract awards.

The locations shown in the tables are the places where the work was to be performed. Normally, this is a facility of the institution awarded the contract. However, if the work was scheduled to be performed at a Defense facility, such as an Air Force base, the location shown is that of the Defense facility rather than the institution.

HIGHLIGHTS OF FY 1981 DATA

The following table shows the number of institutions receiving contracts and the net value of the awards, by type of institution, for FY 1980 and FY 1981.

TYPE OF INSTITUTION	FISCAL YEAR			
	1980		1981	
	NUMBER	AMOUNT*	NUMBER	AMOUNT*
TOTAL	379	$1,172	355	$1,294
U.S. INSTITUTIONS — TOTAL	324	1,136	310	1,256
Educational	203	652	199	711
Other Nonprofit	121	484	111	545
U.S. GOVERNMENT AGENCIES	11	27	10	29
FOREIGN INSTITUTIONS AND GOVERNMENT AGENCIES	44	9	35	9

*Amounts in millions.

In FY 1981, educational and nonprofit institutions received DOD prime contract awards over $10,000 for RDT&E totaling $1,294 million, compared to $1,172 million in FY 1980. This represents an increase of $122 million or 10 percent. Awards to U.S. institutions had the largest percentage increase, increasing from $1,136 million in FY 1980 to $1,265 million in FY 1981, an increase of 11 percent. Awards to U.S. government agencies showed the second largest percentage gain, growing from $27 million in FY 1980 to $29 million in FY 1981, an increase of 7 percent. Awards to foreign institutions remained steady at $9 million in FY 1981.

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ACADEMY INTERSCIENCE METHODOLOGY		200 *
CHICAGO	ILLINOIS	200
ACCREDITATION BOARD FOR ENG & TECH		239 *
NEW YORK	NEW YORK	239
ACOUSTICAL SOCIETY OF AMERICA		17 *
NEW YORK	NEW YORK	17
ADVANCED INTL STUDIES INSTITUTE		250 *
WASHINGTON	DC	250
AEROSPACE CORP		198,931 *
EL SEGUNDO	CALIFORNIA	198,931
AKRON UNIVERSITY OF		130 *
AKRON	OHIO	130
ALABAMA UNIVERSITY OF		1,158 *
BIRMINGHAM	ALABAMA	226
HUNTSVILLE	ALABAMA	759
UNIVERSITY	ALABAMA	173
ALASKA UNIVERSITY OF		559 *
FAIRBANKS CITY	ALASKA	559
AMERICAN FOUNDATION BIOLOGICAL		611 *
ROCKVILLE	MARYLAND	611
AMERICAN HEALTH FOUNDATION		1,509 *
NEW YORK	NEW YORK	1,509
AMERICAN INSTITUTE FOR RESEARCH		752 *
WASHINGTON	DC	752
AMERICAN RED CROSS		62 *
WASHINGTON	DC	62
AMERICAN REGISTRY OF PATHOLOGY		38 *
WASHINGTON	DC	38
AMERICAN SOCIETY FOR ENGINEERING		340 *
WASHINGTON	DC	340
AMERICAN SOCIETY MECHANICAL ENGRS		12 *
NEW YORK	NEW YORK	12
AMERICAN UNIVERSITY		98 *
WASHINGTON	DC	98
ANALYTIC SERVICES INC		6,934 *
ARLINGTON	VIRGINIA	6,813
WILLOW GROVE	PA	59
WRIGHT PATTERS	OHIO	62
ARIZONA STATE UNIVERSITY		546 *
TEMPE	ARIZONA	546
ARIZONA UNIVERSITY OF		3,436 *
TUCSON	ARIZONA	3,436
ARKANSAS UNIVERSITY OF		145 *
ARKADELPHIA	ARKANSAS	96
FAYETTEVILLE	ARKANSAS	49
ASSOCIATION FOR PHYS & SYS MATH		22 *
FRANCONIA	NH	22
ATLANTA UNIVERSITY OF		202 *
ATLANTA	GEORGIA	162
GREENSBORO	NCAR	40
AUBURN UNIVERSITY		366 *
AUBURN	ALABAMA	366
BATTELLE MEMORIAL INSTITUTE		16,600 *
WASHINGTON	DC	146
ABERDEEN PROV	MARYLAND	882
ADELPHI	MARYLAND	14
ANNAPOLIS	MARYLAND	24
ANN ARBOR	MICHIGAN	51
ATLANTA	GEORGIA	75
CLEARWATER	FLORIDA	11
FORT DETRICK	MARYLAND	11
DOVER	NEW JERSEY	426
WHITE SANDS MS	NEW MEXICO	283
FORT MONMOUTH	NEW JERSEY	225
DURHAM	NCAR	251
FORT BELVOIR	VIRGINIA	150
FORT EUSTIS	VIRGINIA	176
FORT LEE	VIRGINIA	32
FORT MONROE	VIRGINIA	535
FORT SILL	OKLAHOMA	11
COLUMBUS	OHIO	11,456
DEER PARK	NEW YORK	17
HUNTSVILLE	ALABAMA	262
FORT GORDON	GEORGIA	39
FORT BLISS	TEXAS	59
RICHLAND	WASHINGTON	665
FORT WORTH	TEXAS	19
VICKSBURG	MISS	11
WALTHAM	MASS	15
REDSTONE ARSEN	ALABAMA	448
WATERTOWN	MASS	22
RESEARCH TRIAN	NCAR	214
WARREN	MICHIGAN	12
SANTA MONICA	CALIFORNIA	13
WRIGHT PATTERS	OHIO	25
BAYLOR UNIVERSITY		319 *
DALLAS	TEXAS	70
HOUSTON	TEXAS	249
BETH ISRAEL HOSPITAL		98 *
BOSTON	MASS	38
NEW YORK	NEW YORK	60
BJORKSTEN RESEARCH LABORATORIES		121 *
MADISON	WISCONSIN	121
BLOOD RESEARCH INSTITUTE INC		67 *
BOSTON	MASS	67
BOSTON COLLEGE		2,868 *
CHESTNUT HILL	MASS	2,200
HANSCOM AFB	MASS	15
NEWTON	MASS	248
WESTON	MASS	405
BOSTON UNIVERSITY		2,584 *
BOSTON	MASS	2,532
CHESTNUT HILL	MASS	52
BOWLING GREEN STATE UNIVERSITY		72 *
BOWLING GREEN	OHIO	43
WILLIAMS AFB	ARIZONA	29
BRADLEY UNIVERSITY		65 *
PEORIA	ILLINOIS	65
BRANDEIS UNIVERSITY		71 *
WALTHAM	MASS	71

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
BRIGHAM YOUNG UNIVERSITY		178 *
PROVO	UTAH	178
BROOKDALE COMMUNITY COLLEGE		13 *
MIDDLETOWN	NEW JERSEY	13
BROOKINGS INSTITUTION		22 *
WASHINGTON	DC	22
BROWN UNIVERSITY		1,341 *
PROVIDENCE	RI	1,341
CALIFORNIA INSTITUTE OF TECHNOLOGY		3,981 *
PASADENA	CALIFORNIA	3,981
CALIFORNIA STATE COLLEGE		70 *
HAYWARD	CALIFORNIA	70
CALIFORNIA STATE OF		133 *
BERKELEY	CALIFORNIA	68
SACRAMENTO	CALIFORNIA	65
CALIFORNIA STATE UNIVERSITY		133 *
LONG BEACH	CALIFORNIA	65
NORTHRIDGE	CALIFORNIA	18
SACRAMENTO	CALIFORNIA	50
CALIFORNIA UNIVERSITY OF		29,878 *
BERKELEY	CALIFORNIA	7,526
DAVIS	CALIFORNIA	117
IRVINE	CALIFORNIA	1,359
LA JOLLA	CALIFORNIA	10,362
LIVERMORE	CALIFORNIA	35
LOS ANGELES	CALIFORNIA	3,672
RIVERSIDE	CALIFORNIA	388
SAN DIEGO	CALIFORNIA	739
SAN FRANCISCO	CALIFORNIA	451
SANTA BARBARA	CALIFORNIA	1,414
SANTA CRUZ	CALIFORNIA	147
SEPULVEDA	CALIFORNIA	60
WRIGHT PATTERS	OHIO	3,608
CAPITOL RADIO ENGINEERING INST INC		1,639 *
SILVER SPRING	MARYLAND	1,639
CARNEGIE MELLON UNIVERSITY		7,295 *
PITTSBURGH	PA	7,295
CASE WESTERN RESERVE UNIVERSITY		2,335 *
CLEVELAND	OHIO	2,335
CATHOLIC UNIVERSITY OF AMERICA		623 *
WASHINGTON	DC	623
CENTRAL FLORIDA UNIVERSITY OF		59 *
ORLANDO	FLORIDA	59
CHARLES STARK DRAPER LABS INC		47,871 *
CAMBRIDGE	MASS	47,871
CHICAGO UNIVERSITY		662 *
CHICAGO	ILLINOIS	662
CINCINNATI UNIVERSITY OF		482 *
CINCINNATI	OHIO	482
CITY OF HOPE MEDICAL CENTER		50 *
DUARTE	CALIFORNIA	50
CITY UNIV OF NEW YORK RSCH FOUND		135 *
FLUSHING	NEW YORK	76
NEW YORK	NEW YORK	59
CITY UNIVERSITY OF NEW YORK		278 *
FLUSHING	NEW YORK	16
NEW YORK	NEW YORK	262
CLAREMONT COLLEGES & UNIV CENTER		25 *
CLAREMONT	CALIFORNIA	25
CLARKSON COLLEGE OF TECHNOLOGY		436 *
POTSDAM	NEW YORK	436
CLEMSON UNIVERSITY		963 *
CLEMSON	SCAR	963
COLORADO SCHOOL OF MINES		383 *
GOLDEN	COLORADO	383
COLORADO STATE UNIVERSITY		2,344 *
FORT COLLINS	COLORADO	2,344
COLORADO UNIVERSITY		1,607 *
BOULDER	COLORADO	1,473
COLORADO SPGS	COLORADO	95
DENVER	COLORADO	39
COLUMBIA UNIVERSITY		5,324 *
NEW YORK	NEW YORK	4,991
PALISADES	NEW YORK	333
CONFERENCE BOARD OF MATH SCIENCES		19 *
WASHINGTON	DC	19
CONNECTICUT UNIVERSITY OF		702 *
FARMINGTON	CONN	236
STORRS	CONN	466
COORDINATING RESEARCH COUNCIL INC		140 *
ATLANTA	GEORGIA	140
CORNELL UNIVERSITY		4,087 *
ITHACA	NEW YORK	3,918
NEW YORK	NEW YORK	169
DARTMOUTH COLLEGE		233 *
HANOVER	NH	233
DAYTON UNIVERSITY OF		13,551 *
KIRTLAND AFB	NEW MEXICO	2,251
WILLIAMS AFB	ARIZONA	963
EDWARDS AFB	CALIFORNIA	308
DAYTON	OHIO	6,049
WRIGHT PATTERS	OHIO	3,980
DECISION ANALYSIS & RSCH INSTITUTE		35 *
BOULDER	COLORADO	35
DELAWARE UNIVERSITY OF		551 *
NEWARK	DELAWARE	551
DENVER UNIVERSITY OF		1,084 *
DENVER	COLORADO	1,084
DETROIT UNIVERSITY OF		23 *
DETROIT	MICHIGAN	23
DISCOVER FOUNDATION INC		197 *
WESTMINSTER	MARYLAND	197
DREXEL UNIVERSITY		952 *
PHILADELPHIA	PA	952

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
DUKE UNIVERSITY		1,335 *
DURHAM	NCAR	1,335
EINSTEIN ALBERT COLLEGE OF MEDICIN		98 *
BRONX	NEW YORK	98
EMMANUEL COLLEGE		813 *
BOSTON	MASS	33
LEXINGTON	MASS	780
ENVIRONMENTAL RSCH INST OF MICH		6,011 *
ANN ARBOR	MICHIGAN	6,011
FAIRLEIGH DICKINSON UNIVERSITY		60 *
HACKENSACK	NEW JERSEY	60
FLORIDA DEPARTMENT OF NATURAL RES		41 *
TALLAHASSEE	FLORIDA	41
FLORIDA GAME & FRESH WATER FISH		25 *
TALLAHASSEE	FLORIDA	25
FLORIDA INSTITUTE OF TECHNOLOGY		35 *
MELBOURNE	FLORIDA	35
FLORIDA STATE UNIVERSITY		1,659 *
GAINESVILLE	FLORIDA	291
TALLAHASSEE	FLORIDA	1,368
FLORIDA TECHNOLOGICAL UNIVERSITY		1,717 *
ORLANDO	FLORIDA	1,717
FLORIDA UNIVERSITY		1,725 *
GAINESVILLE	FLORIDA	1,725
FOREIGN POLICY RESEARCH INSTITUTE		48 *
PHILADELPHIA	PA	48
FRANKLIN INSTITUTE OF PENNSYLVANIA		201 *
PHILADELPHIA	PA	201
FRANKLIN INSTITUTE RESEARCH LAB		752 *
PHILADELPHIA	PA	752
GEOPHYSICAL INSTITUTE OF ALASKA		16 *
FAIRBANKS CITY	ALASKA	16
GEORGE WASHINGTON UNIVERSITY		2,307 *
WASHINGTON	DC	2,307
GEORGETOWN UNIVERSITY		1,257 *
WASHINGTON	DC	1,257
GEORGIA INSTITUTE TECH		5,437 *
ATLANTA	GEORGIA	5,437
GEORGIA STATE COLLEGE		33 *
ATLANTA	GEORGIA	33
GEORGIA TECH RESEARCH INSTITUTE		18,261 *
ATLANTA	GEORGIA	18,261
GEORGIA UNIVERSITY OF		244 *
ATHENS	GEORGIA	244
GORGAS MEMORIAL INSTITUTE OF TROPI		210 *
WASHINGTON	DC	210
GULF SOUTH RESEARCH INSTITUTE		138 *
NEW ORLEANS	LOUISIANA	138
HAHNEMANN MEDICAL COLLEGE & HOSPIT		378 *
PHILADELPHIA	PA	378
HAMPTON INSTITUTE		45 *
HAMPTON	VIRGINIA	45
HARBOR GENERAL HOSPITAL		35 *
TORRANCE	CALIFORNIA	35
HARVARD UNIVERSITY		2,576 *
CAMBRIDGE	MASS	2,576
HAWAII UNIVERSITY OF		1,895 *
HONOLULU CITY	HAWAII	1,895
HOUSTON UNIVERSITY OF		738 *
HOUSTON	TEXAS	738
HOWARD UNIVERSITY		672 *
WASHINGTON	DC	672
HUDSON INSTITUTE		525 *
CROTON ON HUDS	NEW YORK	525
HUMAN RESOURCES RESEARCH ORGN		3,237 *
	GERMANY	641
ALEXANDRIA	VIRGINIA	2,596
ILLINOIS INSTITUTE TECHNOLOGY		36,452 *
ANNAPOLIS	MARYLAND	30,292
CHICAGO	ILLINOIS	5,172
GRIFFISS AFB	NEW YORK	435
ROME	NEW YORK	341
WRIGHT PATTERS	OHIO	212
ILLINOIS UNIVERSITY OF		6,148 *
CHAMPAIGN	ILLINOIS	375
CHICAGO	ILLINOIS	1,118
URBANA	ILLINOIS	4,655
INDIANA UNIVERSITY		442 *
BLOOMINGTON	INDIANA	418
INDIANAPOLIS	INDIANA	24
INDIANA UNIVERSITY FOUNDATION		57 *
BLOOMINGTON	INDIANA	26
INDIANAPOLIS	INDIANA	31
INDIANAPOLIS CTR FOR ADVANCE RSCH		104 *
INDIANAPOLIS	INDIANA	104
INSTITUTE FOR ADVANCED STUDY		24 *
PRINCETON	NEW JERSEY	24
INSTITUTE FOR DEFENSE ANALYSIS		14,690 *
ARLINGTON	VIRGINIA	14,690
INSTITUTE FOR EXP PSYCHIATRY INC		65 *
MERION	PA	65
INSTITUTE FOREIGN POLICY ANALYSIS		305 *
CAMBRIDGE	MASS	305
INSTITUTE MEDICAL RSCH SANTA CLARA		52 *
SAN JOSE	CALIFORNIA	52
INSTITUTE OF GAS TECHNOLOGY		89 *
CHICAGO	ILLINOIS	89
INTERNATIONAL READING ASSOCIATION		45 *
NEWARK	DELAWARE	45

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
INTERNATIONAL RESEARCH INSTITUTE	29 *
MCLEAN VIRGINIA	29
IOWA STATE UNIV OF SCIENCE & TECH	195 *
AMES IOWA	172
DES MOINES IOWA	23
IOWA UNIVERSITY OF	1,223 *
IOWA CITY IOWA	1,223
JACKSON STATE UNIVERSITY	223 *
JACKSON MISS	223
JACKSONVILLE STATE UNIVERSITY	37 *
JACKSONVILLE ALABAMA	37
JOHN CARROLL UNIVERSITY	224 *
CLEVELAND OHIO	224
JOHNS HOPKINS UNIVERSITY	186,350 *
BALTIMORE MARYLAND	103,884
LAUREL MARYLAND	118,382
SCAGGSVILLE MARYLAND	35,916-
KANSAS STATE UNIVERSITY	290 *
MANHATTAN KANSAS	290
KANSAS UNIVERSITY OF	344 *
KANSAS CITY KANSAS	194
LAWRENCE KANSAS	150
KENTUCKY RESEARCH FOUNDATION	95 *
LEXINGTON KENTUCKY	95
KENTUCKY UNIVERSITY OF	61 *
LEXINGTON KENTUCKY	61
LA JOLLA INSTITUTE	548 *
ROCKVILLE MARYLAND	35
LA JOLLA CALIFORNIA	513
LEHIGH UNIVERSITY	1,099 *
BETHLEHEM PA	1,099
LOUISIANA STATE UNIVERSITY OF	1,020 *
BATON ROUGE LOUISIANA	974
NEW ORLEANS LOUISIANA	46
LOUISVILLE UNIVERSITY OF	159 *
LOUISVILLE KENTUCKY	159
LOWELL OBSERVATORY	31 *
FLAGSTAFF ARIZONA	31
LOWELL TECHNOLOGICAL INSTITUTE	287 *
LOWELL MASS	287
LOWELL UNIVERSITY OF	84 *
LOWELL MASS	84
MAINE UNIVERSITY OF	70 *
ORONO MAINE	70
MARINE BIOLOGICAL LABORATORY	34 *
WOODS HOLE MASS	34
MARYLAND UNIVERSITY OF	6,775 *
BALTIMORE MARYLAND	2,451
COLLEGE PARK MARYLAND	4,324

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
MASSACHUSETTS INSTITUTE TECHNOLOGY	163,827 *
CAMBRIDGE MASS	26,108
LEXINGTON MASS	137,719
MASSACHUSETTS UNIVERSITY OF	1,577 *
AMHERST MASS	1,577
MAYO FOUNDATION	100 *
ROCHESTER MINNESOTA	100
MEDICAL COLLEGE OF OHIO	164 *
TOLEDO OHIO	164
MEDICAL COLLEGE OF WISCONSIN	61 *
MILWAUKEE WISCONSIN	61
MEDICAL UNIV OF SOUTH CAROLINA	76 *
CHARLESTON SCAR	76
MEHARRY MEDICAL COLLEGE	34 *
NASHVILLE TENNESSEE	34
MIAMI UNIVERSITY	43 *
OXFORD OHIO	18
WRIGHT PATTERS OHIO	25
MIAMI UNIVERSITY OF	2,785 *
CORAL GABLES FLORIDA	2,406
MIAMI FLORIDA	379
MICHAEL REESE RESEARCH FOUNDATION	97 *
CHICAGO ILLINOIS	97
MICHIGAN STATE DEPT OF HEALTH	15 *
LANSING MICHIGAN	15
MICHIGAN STATE UNIVERSITY	863 *
EAST LANSING MICHIGAN	863
MICHIGAN TECHNOLOGICAL UNIVERSITY	787 *
HOUGHTON MICHIGAN	787
MICHIGAN UNIVERSITY OF	3,504 *
ANN ARBOR MICHIGAN	3,504
MIDWEST RESEARCH INSTITUTE	759 *
KANSAS CITY MISSOURI	759
MILITARY OPERATIONS RESEARCH SOC	63 *
ALEXANDRIA VIRGINIA	63
MINNESOTA UNIVERSITY OF	1,960 *
MINNEAPOLIS MINNESOTA	1,120
ST PAUL MINNESOTA	840
MISSISSIPPI STATE UNIVERSITY	187 *
MISSISSIPPI CI MISS	28
STATE COLLEGE MISS	159
MISSISSIPPI UNIVERSITY OF	564 *
JACKSON MISS	195
UNIVERSITY MISS	369
MISSOURI UNIVERSITY OF	1,040 *
COLUMBIA MISSOURI	609
KANSAS CITY MISSOURI	78
ROLLA MISSOURI	353
MITRE CORP	128,789 *
GREECE	39
BEDFORD MASS	128,750

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
MONMOUTH COLLEGE		12 *
WEST LONG BRAN	NEW JERSEY	12
MONTANA STATE UNIVERSITY		230 *
BOZEMAN	MONTANA	230
MONTEFIORE HOSPITAL MEDICAL CENTER		41 *
NEW YORK	NEW YORK	41
MOREHOUSE COLLEGE		52 *
ATLANTA	GEORGIA	52
MORGAN STATE COLLEGE		50 *
BALTIMORE	MARYLAND	50
MORRIS BROWN COLLEGE		33 *
ATLANTA	GEORGIA	33
MOUNT SINAI HOSPITAL		31 *
NEW YORK	NEW YORK	31
MOUNT WASHINGTON OBSERVATORY		12 *
WARNER	NH	12
NATIONAL COUNCIL ON RADN PROT MEAS		15 *
WASHINGTON	DC	15
NATIONAL COUNCIL SOVIET EAST EUROP		115 *
WASHINGTON	DC	115
NATIONAL GRADUATE UNIVERSITY		11 *
WASHINGTON	DC	11
NEBRASKA UNIVERSITY OF		258 *
LINCOLN	NEBRASKA	258
NEVADA UNIVERSITY OF		224 *
RENO	NEVADA	224
NEW HAMPSHIRE UNIVERSITY OF		653 *
DURHAM	NH	653
NEW JERSEY COLLEGE MEDICINE DENTIS		79 *
NEWARK	NEW JERSEY	79
NEW JERSEY INSTITUTE OF TECHNOLOGY		16 *
NEWARK	NEW JERSEY	16
NEW MEXICO INSTITUTE MINING & TECH		1,643 *
SOCORRO	NEW MEXICO	1,643
NEW MEXICO STATE UNIVERSITY		3,994 *
LAS CRUCES	NEW MEXICO	1,710
WHITE SANDS MS	NEW MEXICO	2,284
NEW MEXICO UNIVERSITY OF		6,631 *
ALBUQUERQUE	NEW MEXICO	373
KIRTLAND AFB	NEW MEXICO	6,258
NEW ORLEANS UNIVERSITY OF		63 *
NEW ORLEANS	LOUISIANA	63
NEW YORK BLOOD CENTER INC		75 *
NEW YORK	NEW YORK	75
NEW YORK POLYTECHNIC INSTITUTE		1,783 *
BROOKLYN	NEW YORK	1,718
NEW YORK	NEW YORK	65
NEW YORK STATE UNIV RESEARCH FOUND		1,780 *
ALBANY	NEW YORK	1,676
BUFFALO	NEW YORK	26
STONY BROOK	NEW YORK	78
NEW YORK STATE UNIVERSITY OF		247 *
ALBANY	NEW YORK	170
BINGHAMTON	NEW YORK	23
NEW YORK	NEW YORK	54
NEW YORK UNIVERSITY		1,134 *
NEW YORK	NEW YORK	1,134
NORTH CAROLINA AGRI & TECH STATE U		578 *
GREENSBORO	NCAR	578
NORTH CAROLINA STATE UNIVERSITY		1,201 *
CHAPEL HILL	NCAR	33
RALEIGH	NCAR	1,168
NORTH CAROLINA UNIVERSITY OF		859 *
CHAPEL HILL	NCAR	773
WILMINGTON	NCAR	86
NORTH DAKOTA UNIVERSITY OF		30 *
GRAND FORKS	NDAK	30
NORTH TEXAS STATE UNIVERSITY		240 *
DENTON	TEXAS	240
NORTHEASTERN RESEARCH FOUNDATION		126 *
BOOTHBAY HARBO	MAINE	126
NORTHEASTERN UNIVERSITY		1,554 *
BOSTON	MASS	1,554
NORTHERN ARIZONA UNIVERSITY		100 *
FLAGSTAFF	ARIZONA	100
NORTHWESTERN UNIVERSITY		2,514 *
EVANSTON	ILLINOIS	2,514
NOTRE DAME UNIVERSITY OF		266 *
NOTRE DAME	INDIANA	266
NOVA UNIVERSITY OF ADVANCED TECH		80 *
MELBOURNE	FLORIDA	80
OAKLAND UNIVERSITY		125 *
ROCHESTER	MICHIGAN	125
OHIO STATE OF		40 *
COLUMBUS	OHIO	40
OHIO STATE UNIV RESERCH FOUNDATION		3,450 *
COLUMBUS	OHIO	3,450
OHIO STATE UNIVERSITY THE		1,149 *
COLUMBUS	OHIO	1,149
OHIO UNIVERSITY		59 *
ATHENS	OHIO	59
OHIO WESLEYAN UNIVERSITY		74 *
DELAWARE	OHIO	74
OKLAHOMA STATE UNIVERSITY OF		2,177 *
EGLIN AFB	FLORIDA	1,218
STILLWATER	OKLAHOMA	959
OKLAHOMA UNIVERSITY OF		527 *
NORMAN	OKLAHOMA	469
OKLAHOMA CITY	OKLAHOMA	58
OLD DOMINION COLLEGE		54 *
NORFOLK	VIRGINIA	54

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
OLD DOMINION UNIVERSITY RSCH FOUND		724 *
NORFOLK	VIRGINIA	724
OREGON GRADUATE CTR FOR STUDY RES		172 *
BEAVERTON	OREGON	172
OREGON STATE UNIVERSITY		3,380 *
CORVALLIS	OREGON	3,380
OREGON UNIVERSITY OF		340 *
EUGENE	OREGON	252
PORTLAND	OREGON	88
PALISADES GEOPHYSICAL INSTITUTE		1,662 *
	BERMUDA	210
BLAUVELT	NEW YORK	429
MIAMI	FLORIDA	11
WEST NYACK	NEW YORK	1,012
PALISADES INSTITUTE		780 *
NEW YORK	NEW YORK	780
PASADENA FOUNDATION MEDICAL RSCH		50 *
PASADENA	CALIFORNIA	50
PENNSYLVANIA COLLEGE OF OPTOMETRY		17 *
PHILADELPHIA	PA	17
PENNSYLVANIA HOSPITAL CONTRIBUTORS		113 *
PHILADELPHIA	PA	113
PENNSYLVANIA STATE UNIVERSITY		15,018 *
HERSHEY	PA	16
STATE COLLEGE	PA	1,216
UNIVERSITY PAR	PA	13,786
PENNSYLVANIA UNIVERSITY OF		5,424 *
WASHINGTON	DC	126
PHILADELPHIA	PA	5,298
PETER BENT BRIGHAM HOSPITAL		252 *
BOSTON	MASS	252
PHILADELPHIA CHILDRENS HOSPITAL		74 *
PHILADELPHIA	PA	74
PITTSBURGH UNIVERSITY OF		1,826 *
PITTSBURGH	PA	1,826
POLYTECHNIC INSTITUTE OF NEW YORK		12 *
BROOKLYN	NEW YORK	12
PORTLAND STATE UNIVERSITY		185 *
PORTLAND	OREGON	185
POTOMAC INSTITUTE FOR ECON RESEARC		84 *
WASHINGTON	DC	84
PRINCETON UNIVERSITY		2,684 *
PRINCETON	NEW JERSEY	2,684
PUERTO RICO UNIVERSITY OF		145 *
MAYAGUEZ	PUERTO RCO	56
SAN JUAN	PUERTO RCO	89
PURDUE RESEARCH FOUNDATION		1,952 *
LAFAYETTE	INDIANA	124
WEST LAFAYETTE	INDIANA	1,828
PURDUE UNIVERSITY		283 *
LAFAYETTE	INDIANA	54
WEST LAFAYETTE	INDIANA	229
QUEENS HOSPITAL MEDICAL CENTER		141 *
HONOLULU CITY	HAWAII	141
RAND CORP		20,457 *
SANTA MONICA	CALIFORNIA	20,457
REGIS COLLEGE		392 *
WESTON	MASS	392
RENSSELAER POLYTECHNIC INSTITUTE		1,842 *
TROY	NEW YORK	1,842
RESEARCH FOUNDATION OF SUNY BUFFAL		61 *
BUFFALO	NEW YORK	61
RESEARCH INSTITUTE OF COLORADO		31 *
FORT COLLINS	COLORADO	31
RESEARCH TRIANGLE INSTITUTE		1,376 *
RESEARCH TRIAN	NCAR	1,376
RHODE ISLAND UNIVERSITY OF		1,749 *
KINGSTON	RI	1,749
RICE UNIVERSITY		446 *
HOUSTON	TEXAS	446
RIVERSIDE RESEARCH INSTITUTE		3,097 *
ARLINGTON	VIRGINIA	463
NEW YORK	NEW YORK	2,634
ROCHESTER INSTITUTE OF TECHNOLOGY		93 *
ROCHESTER	NEW YORK	93
ROCHESTER UNIVERSITY OF		15,044 *
ARLINGTON	VIRGINIA	13,431
ROCHESTER	NEW YORK	1,613
ROCKEFELLER UNIVERSITY		147 *
NEW YORK	NEW YORK	147
RUTGERS UNIVERSITY		708 *
NEW BRUNSWICK	NEW JERSEY	481
PISCATAWAY	NEW JERSEY	227
S R I INTERNATIONAL		33,909 *
ARLINGTON	VIRGINIA	12
MENLO PARK	CALIFORNIA	33,047
MOFFETT FIELD	CALIFORNIA	850
SAINT JOSEPH COLLEGE MARYLAND		60 *
PHILADELPHIA	PA	60
SAINT LOUIS UNIVERSITY		272 *
CAHOKIA	ILLINOIS	20
ST LOUIS	MISSOURI	252
SALK INSTITUTE THE		1,074 *
SWIFTWATER	PA	1,074
SAN DIEGO SOCIETY OF NATURAL HISTO		33 *
SAN DIEGO	CALIFORNIA	33
SAN DIEGO STATE UNIV FOUNDATION		82 *
SAN DIEGO	CALIFORNIA	82
SAN DIEGO UNIVERSITY FOUNDATION		144 *
SAN DIEGO	CALIFORNIA	144
SAN FRANCISCO UNIVERSITY OF		27 *
SAN FRANCISCO	CALIFORNIA	27

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
SAN JOSE STATE UNIVERSITY FOUND		331 *
LONG BEACH	CALIFORNIA	226
SAN JOSE	CALIFORNIA	105
SCRIPPS CLINIC RESEARCH		145 *
LA JOLLA	CALIFORNIA	145
SOCIETY INDUSTRIAL APPLIED MATH		20 *
PHILADELPHIA	PA	20
SOCIETY OF AUTOMOTIVE ENGINEERS		50 *
WARRENDALE	PA	50
SOUTH ALABAMA UNIVERSITY OF		12 *
MOBILE	ALABAMA	12
SOUTH CAROLINA UNIVERSITY OF		309 *
COLUMBIA	SCAR	309
SOUTH CAROLINE WILDLIFE RESOURCES		23 *
HARTWELL	GEORGIA	23
SOUTH DAKOTA STATE UNIVERSITY		79 *
BROOKINGS	SDAK	79
SOUTH FLORIDA UNIVERSITY OF		307 *
TAMPA	FLORIDA	307
SOUTHEASTERN CTR ELECT ENGR EDUC		2,575 *
ORLANDO	FLORIDA	136
ST CLOUD	FLORIDA	2,217
WRIGHT PATTERS	OHIO	222
SOUTHEASTERN MASS TECH INSTITUTE		62 *
DARTMOUTH	MASS	62
SOUTHERN CALIFORNIA UNIVERSITY OF		2,614 *
LOS ANGELES	CALIFORNIA	2,499
MARINA DEL REY	CALIFORNIA	115
SOUTHERN ILLINOIS UNIVERSITY		12 *
EDWARDSVILLE	ILLINOIS	12
SOUTHERN METHODIST UNIVERSITY OF		435 *
DALLAS	TEXAS	435
SOUTHERN RESEARCH INSTITUTE		1,643 *
BIRMINGHAM	ALABAMA	1,643
SOUTHWEST RESEARCH INSTITUTE		4,629 *
SAN ANTONIO	TEXAS	4,629
SOUTHWESTERN LOUISIANA UNIVERSITY		13 *
LAFAYETTE	LOUISIANA	13
STANFORD UNIVERSITY		18,004 *
MENLO PARK	CALIFORNIA	95
PALO ALTO	CALIFORNIA	254
STANFORD	CALIFORNIA	17,655
STEVENS INSTITUTE OF TECHNOLOGY		1,669 *
HOBOKEN	NEW JERSEY	1,669
SYRACUSE RESEARCH CORP		1,521 *
SYRACUSE	NEW YORK	1,521
SYRACUSE UNIVERSITY		1,587 *
ROME	NEW YORK	207
SYRACUSE	NEW YORK	1,380
SYRACUSE UNIVERSITY RESEARCH CORP		775 *
SYRACUSE	NEW YORK	775
TEMPLE UNIVERSITY		66 *
PHILADELPHIA	PA	66
TENNESSEE UNIVERSITY OF		1,061 *
KNOXVILLE	TENNESSEE	661
MEMPHIS	TENNESSEE	46
TULLAHOMA	TENNESSEE	354
TEXAS A & M RESEARCH FOUNDATION		3,008 *
COLLEGE STATIO	TEXAS	3,008
TEXAS A & M UNIVERSITY		612 *
COLLEGE STATIO	TEXAS	612
TEXAS CHRISTIAN UNIVERSITY		197 *
FORT WORTH	TEXAS	197
TEXAS TECHNOLOGICAL COLLEGE		1,695 *
LUBBOCK	TEXAS	1,695
TEXAS UNIVERSITY OF		16,514 *
ARLINGTON	TEXAS	70
AUSTIN	TEXAS	15,415
DALLAS	TEXAS	95
EL PASO	TEXAS	135
GALVESTON	TEXAS	61
HOUSTON	TEXAS	50
RICHARDSON	TEXAS	102
SAN ANTONIO	TEXAS	586
TRINITY UNIVERSITY		54 *
SAN ANTONIO	TEXAS	54
TUFTS UNIVERSITY		292 *
BOSTON	MASS	43
MEDFORD	MASS	249
TULANE UNIVERSITY OF LOUISIANA		125 *
COVINGTON	LOUISIANA	95
NEW ORLEANS	LOUISIANA	30
TULSA UNIVERSITY OF		48 *
TULSA	OKLAHOMA	48
TUSKEGEE INSTITUTE		62 *
TUSKEGEE	ALABAMA	62
UNDERSEA MEDICAL SOCIETY INC		53 *
BETHESDA	MARYLAND	53
UNIVERSITY HOSPITAL INC		90 *
BOSTON	MASS	90
UTAH STATE UNIVERSITY		6,700 *
LOGAN	UTAH	6,700
UTAH UNIVERSITY OF		1,647 *
DUGWAY	UTAH	84
SALT LAKE CITY	UTAH	1,563
VANDERBILT UNIVERSITY		380 *
NASHVILLE	TENNESSEE	380
VERMONT UNIVERSITY OF		96 *
BURLINGTON	VERMONT	96
VILLANOVA UNIVERSITY		25 *
VILLANOVA	PA	25

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1981 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
VIRGINIA COMMONWEALTH UNIVERSITY		137 *
RICHMOND	VIRGINIA	137
VIRGINIA INST OF MARINE SCIENCES		125 *
GLOUCESTER POI	VIRGINIA	125
VIRGINIA MASON RESEARCH CENTER		102 *
SEATTLE	WASHINGTON	102
VIRGINIA POLYTECHNIC INSTITUTE		2,204 *
BLACKSBURG	VIRGINIA	2,204
VIRGINIA UNIVERSITY OF		1,297 *
CHARLOTTESVILL	VIRGINIA	1,297
WASHINGTON STATE UNIVERSITY		935 *
PULLMAN	WASHINGTON	935
WASHINGTON UNIVERSITY		1,033 *
ST LOUIS	MISSOURI	1,033
WASHINGTON UNIVERSITY OF		13,529 *
SEATTLE	WASHINGTON	13,354
ST LOUIS	MISSOURI	175
WAYNE STATE UNIVERSITY		386 *
DETROIT	MICHIGAN	386
WENTWORTH INSTITUTE		1,627 *
BOSTON	MASS	1,627
WEST FLORIDA UNIVERSITY OF		48 *
PENSACOLA	FLORIDA	48
WEST VIRGINIA UNIVERSITY		18 *
MORGANTOWN	WVA	18
WESTERN KENTUCKY UNIVERSITY		29 *
BOWLING GREEN	KENTUCKY	29
WESTERN MICHIGAN UNIVERSITY		22 *
KALAMAZOO	MICHIGAN	22
WICAT INC		372 *
OREM	UTAH	372
WILLIAMS COLLEGE		55 *
WILLIAMSTOWN	MASS	55
WISCONSIN UNIVERSITY OF		4,047 *
MADISON	WISCONSIN	4,015
MILWAUKEE	WISCONSIN	32
WOODS HOLE OCEANOGRAPHIC INST		7,403 *
WOODS HOLE	MASS	7,403
WORCESTER POLYTECHNIC INSTITUTE		63 *
WORCESTER	MASS	63
WRIGHT STATE UNIVERSITY		675 *
DAYTON	OHIO	377
WRIGHT PATTERS	OHIO	298
WYOMING UNIVERSITY OF		358 *
LARAMIE	WYOMING	358
YALE UNIVERSITY		2,801 *
NEW HAVEN	CONN	2,801
YESHIVA UNIVERSITY		153 *
BRONX	NEW YORK	153
		1,256,406

Table 2. U.S. Government Agencies Receiving DOD Prime Contract Awards Over $10,000 for RDT&E Work: FY 1981

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
AMERICAN EMBASSY		35 *		
	JAPAN	35		
INSECTS AFFECTING MAN ANIMALS RSCH		65 *		
GAINESVILLE	FLORIDA	65		
NATIONAL ACADEMY OF SCIENCES		6,311 *		
WASHINGTON	DC	5,892		
ABERDEEN PROV	MARYLAND	65		
BETHESDA	MARYLAND	224		
WHITE SANDS MS	NEW MEXICO	130		
NATIONAL SCIENCE FOUNDATION		801 *		
WASHINGTON	DC	801		
SMITHSONIAN INSTITUTION		726 *		
WASHINGTON	DC	461		
CAMBRIDGE	MASS	265		
UNITED STATES COMMERCE DEPT		2,946 *		
WASHINGTON	DC	1,705		
BOULDER	COLORADO	940		
GAITHERSBURG	MARYLAND	105		
MIAMI	FLORIDA	105		
ROCKVILLE	MARYLAND	50		
SEATTLE	WASHINGTON	41		
UNITED STATES ENERGY DEPT		699 *		
ALBUQUERQUE	NEW MEXICO	26		
ARGONNE	ILLINOIS	74		
OAK RIDGE	TENNESSEE	66		
OAKLAND	CALIFORNIA	533		
UNITED STATES LABOR DEPT		100 *		
WASHINGTON	DC	100		
UNITED STATES NATL AERO SPACE AGY		16,984 *		
RIDGELEY	WVA	16,984		
UNITED STATES OFFICE OF MGT & BGOT		490 *		
	JAPAN	490		
		29,157		

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $10,000 for RDT&E Work: FY 1981

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
ASSOC DES AMIS DES UNIV DE LORRAIN	36 *
FRANCE	36
BEN GURION UNIVERSITY OF THE NEGEV	23 *
ISRAEL	23
BRISTOL UNIVERSITY OF	84 *
UN KINGDOM	84
CAMBRIDGE UNIVERSITY OF	128 *
UN KINGDOM	128
EAST ANGLIA UNIVERSITY OF	15 *
UN KINGDOM	15
ECOLE POLYTECHQUE FEDERALE	26 *
SWITZERLND	26
FEDERAL REPUBLIC OF GERMANY	16 *
EGLIN AFB FLORIDA	16
FREIDRICH ALEXANDER UNIVERSITAET	126 *
GERMANY	126
HEBREW UNIVERSITY	64 *
ISRAEL	64
IMPERIAL COLLEGE OF SCIENCE & TECH	162 *
UN KINGDOM	162
INSTITUT FUER ATMOSPHAERISCHE	25 *
GERMANY	25
INVERESK RESEARCH INTERNATIONAL	[illegible] *
UN KINGDOM	106
ISRAEL INSTITUTE OF TECHNOLOGY	55 *
ISRAEL	55
KEELE UNIVERSITY OF	28 *
UN KINGDOM	28
LEEDS UNIVERSITY OF	34 *
UN KINGDOM	34
LIVERPOOL UNIVERSITY OF	23 *
UN KINGDOM	23
LONDON UNIVERSITY OF	58 *
UN KINGDOM	58
MANCHESTER UNIVERSITY	29 *
UN KINGDOM	29
MCGILL UNIVERSITY	50 *
CANADA	50
NORTH WALES UNIVERSITY COLLEGE OF	88 *
UN KINGDOM	88
OPEN UNIVERSITY THE	19 *
UN KINGDOM	19
OXFORD UNIVERSITY	24 *
UN KINGDOM	24
QUEEN MARY COLLEGE	63 *
UN KINGDOM	63
QUEENSLAND UNIVERSITY	39 *
AUSTRIA	39
ROYAL COLLEGE OF MILITARY SCIENCE	22 *
UN KINGDOM	22
ROYAL NORWEGIAN NAV MAT COMM	4,232 *
NORWAY	4,232
SALFORD UNIVERSITY OF	52 *
UN KINGDOM	52
TAVISTOCK INSTITUTE OF HUMAN REL	40 *
UN KINGDOM	40
TEL AVIV UNIVERSITY	108 *
ISRAEL	108
TORONTO UNIVERSITY OF	75 *
CANADA	73
TRINITY COLLEGE ENGINEERING SCHOOL	12 *
IRELAND	12
ULSTER THE NEW UNIVERSITY OF	30 *
UN KINGDOM	30
UNITED KINGDOM GENERAL POST OFFICE	30 *
UN KINGDOM	30
UNITED KINGDOM MINISTRY OF DEFENCE	2,670 *
UN KINGDOM	2,670
UNIVERSITE RENE DESCARTES	10 *
FRANCE	10
	8,602

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ACADEMY INTERSCIENCE METHODOLOGY		85 •
CHICAGO	ILLINOIS	85
ACADEMY OF APPLIED SCIENCE INC		66 •
	UN KINGDOM	12
GAINESVILLE	FLORIDA	13
DETROIT	MICHIGAN	12
RALEIGH	NCAR	15
WEST LONG BRAN	NEW JERSEY	14
ACCREDITATION BOARD FOR ENG & TECH		226 •
NEW YORK	NEW YORK	226
ADVANCED INTL STUDIES INSTITUTE		365 •
WASHINGTON	DC	365
AEROSPACE CORP		236,546 •
EL SEGUNDO	CALIFORNIA	236,546
AKRON UNIVERSITY OF		132 •
AKRON	OHIO	132
ALABAMA A & M UNIVERSITY		69 •
HUNTSVILLE	ALABAMA	25
NORMAL	ALABAMA	44
ALABAMA UNIVERSITY OF		917 •
BIRMINGHAM	ALABAMA	275
HUNTSVILLE	ALABAMA	529
NORMAL	ALABAMA	25
UNIVERSITY	ALABAMA	88
ALASKA UNIVERSITY OF		490 •
FAIRBANKS	ALASKA	490
ALBANY MEDICAL COLLEGE UNION UNIV		146 •
ALBANY	NEW YORK	146
AMERICAN COLLEGE TESTING PGM		125 •
IOWA CITY	IOWA	125
AMERICAN DENTAL ASSOCIATION		30 •
CHICAGO	ILLINOIS	30
AMERICAN FOUNDATION BIOLOGICAL		340 •
ROCKVILLE	MARYLAND	340
AMERICAN INSTITUTE FOR RESEARCH		590 •
WASHINGTON	DC	590
AMERICAN RED CROSS		79 •
WASHINGTON	DC	79
AMERICAN REGISTRY OF PATHOLOGY		150 •
WASHINGTON	DC	150
AMERICAN SOCIETY FOR ENGINEERING		637 •
WASHINGTON	DC	637
AMERICAN UNIVERSITY		114 •
WASHINGTON	DC	114
ANALYTIC SERVICES INC		6,851 •
ARLINGTON	VIRGINIA	6,636
WILLOW GROVE	PA	215
ARIZONA STATE UNIVERSITY		852 •
TEMPE	ARIZONA	852
ARIZONA UNIVERSITY OF		3,450 •
TUCSON	ARIZONA	3,450
ARKANSAS UNIVERSITY OF		423
ARKADELPHIA	ARKANSAS	373
FAYETTEVILLE	ARKANSAS	50
ASSOCIATED UNIVERSITIES INC		20 •
WASHINGTON	DC	20
ASSOCIATION FOR PHYS & SYS MATH		23 •
FRANCONIA	NH	23
ATLANTA UNIVERSITY OF		214
ATLANTA	GEORGIA	214
AUBURN UNIVERSITY		400
AUBURN	ALABAMA	400
B O C E S		27
GOSHEN	NEW YORK	27
BATTELLE MEMORIAL INSTITUTE		21,060
WASHINGTON	DC	56
ABERDEEN PROV	MARYLAND	383
ALEXANDRIA	VIRGINIA	12
ADELPHI	MARYLAND	37
ANN ARBOR	MICHIGAN	81
ATLANTA	GEORGIA	10
BURLINGTON	MASS	32
CAMBRIDGE	MASS	52
BERKELEY HGTS	NEW JERSEY	20
PROVIDENCE	RI	23
COMMERCE CITY	COLORADO	20
CORVALLIS	OREGON	22
DENVER	COLORADO	125
FORT COLLINS	COLORADO	13
BROOKLYN	NEW YORK	11
BUFFALO	NEW YORK	18
DOVER	NEW JERSEY	313
TUCSON	ARIZONA	15
WHITE SANDS MS	NEW MEXICO	127
GAINESVILLE	FLORIDA	183
LEXINGTON	MASS	18
FALLS CHURCH	VIRGINIA	13
FORT MONMOUTH	NEW JERSEY	91
DURHAM	NCAR	35
FORT BELVOIR	VIRGINIA	100
FORT EUSTIS	VIRGINIA	85
FORT MONROE	VIRGINIA	158
CHAMPAIGN	ILLINOIS	44
COLLEGE STATIO	TEXAS	21
CHICAGO	ILLINOIS	34
CLEVELAND	OHIO	21
NATICK	MASS	21
COLUMBUS	OHIO	15,526
HAMPTON	VIRGINIA	19
HUNTSVILLE	ALABAMA	301
DAYTON	OHIO	20
READING	MASS	38
LOUISVILLE	KENTUCKY	86
FORT GORDON	GEORGIA	23
MCLEAN	VIRGINIA	41
RICHLAND	WASHINGTON	1,080
VICKSBURG	MISS	13
WAKEFIELD	MASS	39
REDSTONE ARSEN	ALABAMA	391
TULLAHOMA	TENNESSEE	17
WATERTOWN	MASS	39
MADISON	WISCONSIN	25
FORT SHERIDAN	ILLINOIS	37
PINE BLUFF	ARKANSAS	12
ROANOKE	VIRGINIA	27
LA JOLLA	CALIFORNIA	20
RED BANK	NEW JERSEY	23
LONG BEACH	CALIFORNIA	127
WARRENTON	VIRGINIA	16

Department of Defense

EDUCATIONAL AND NONPROFIT INSTITUTIONS RECEIVING PRIME CONTRACT AWARDS FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Fiscal Year 1982

Issued Annually by

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Washington Headquarters Services
Directorate for Information
Operations and Reports

FOREWORD

Educational and Nonprofit Institutions Receiving Prime Contract Awards for Research, Development, Test, and Evaluation is published annually by the Office of the Secretary of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (WHS/DIOR).

This report provides information on Department of Defense prime contract awards to educational and nonprofit institutions during Fiscal Year 1982. These data are shown in three sections, organized by awards to:

1. Educational and nonprofit institutions within the United States;
2. U.S. government agencies; and
3. Foreign institutions and government agencies.

Requests for additional information should be addressed to the WHS/DIOR Special Projects Division, Room 1C535, The Pentagon, Washington, D.C., 20301.

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INTRODUCTION

This report presents data on Department of Defense (DOD) prime contract awards over $10,000 for research, development, test, and evaluation (RDT&E) made to educational and nonprofit institutions during Fiscal Year (FY) 1982. The data are presented in three tables, each of which lists contractors alphabetically and gives the net value of all awards to the contractor as well as the value of the awards to each of the contractor's locations, where applicable. Table 1 covers awards to educational and other nonprofit institutions in the United States, Table 2 covers awards to U.S. government agencies, and data on awards to foreign institutions and government agencies are provided in Table 3.

NOTES ON COVERAGE

The dollar amounts shown here include prime contract awards over $10,000 for RDT&E work only. Data on awards for other services, such as training, and on any supplies furnished by the contractor in support of research being done are excluded. Contract awards for civil functions are included in these data. Civil functions encompass planning, programming, designing, constructing, and operating Federal water resources projects for navigation, flood control, hydroelectric power production, water supply, and other related activities.

The locations shown in the tables are the sites where the work was to be performed. Normally, this is a facility of the institution awarded the contract. However, if the work was scheduled to be performed at a Defense facility, such as an Air Force base, the location shown is that of the Defense facility rather than the institution.

HIGHLIGHTS OF FY 1982 DATA

The following table shows the number of institutions receiving contracts and the net value of the awards, by type of institution, for FY 1981 and FY 1982.

TYPE OF INSTITUTION	FISCAL YEAR			
	1981		1982	
	NUMBER	AMOUNT*	NUMBER	AMOUNT*
TOTAL	355	$1,294	387	$1,538
U.S. INSTITUTIONS — TOTAL	310	1,256	326	1,500
Educational	199	711	213	852
Other Nonprofit	111	545	113	648
U.S. GOVERNMENT AGENCIES	10	29	13	35
FOREIGN INSTITUTIONS AND GOVERNMENT AGENCIES	35	9	48	3

*Amounts in millions.

In FY 1982, educational and nonprofit institutions received DOD prime contract awards over $10,000 for RDT&E totaling $1,538 million compared to $1,294 million in FY 1981. This represents an increase of $244 million or 18.9 percent. Awards to U.S. government agencies had the largest percentage increase of all institutions, increasing from $29 million in FY 1981 to $35 million in FY 1982, an increase of 20.7 percent. Awards to U.S. institutions had the second largest percentage gain, growing from $1,256 million in FY 1981 to $1,500 million in FY 1982, an increase of 16.3 percent. Awards to foreign institutions decreased from $9 million in FY 1981 to $3 million in FY 1982, a decrease of 66.7 percent.

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
BATTELLE MEMORIAL INSTITUTE		
YORKTOWN	VIRGINIA	19
MONTEREY	CALIFORNIA	14
MINNEAPOLIS	MINNESOTA	25
RESEARCH TRIAN	NCAR	538
NEW YORK	NEW YORK	16
SAN DIEGO	CALIFORNIA	223
STANFORD	CALIFORNIA	12
ROCK ISLAND	ILLINOIS	12
BAYLOR UNIVERSITY		434 •
DALLAS	TEXAS	15
HOUSTON	TEXAS	419
BETH ISRAEL HOSPITAL		79 •
BOSTON	MASS	79
BOSTON COLLEGE		2,611 •
CHESTNUT HILL	MASS	1,693
HANSCOM AFB	MASS	180
NEWTON	MASS	217
WESTON	MASS	521
BOSTON UNIVERSITY		2,702 •
BOSTON	MASS	2,644
CHESTNUT HILL	MASS	58
BOWLING GREEN STATE UNIVERSITY		29 •
WILLIAMS AFB	ARIZONA	29
BRANDEIS UNIVERSITY		142 •
WALTHAM	MASS	142
BRIGHAM YOUNG UNIVERSITY		329 •
PROVO	UTAH	329
BROOKDALE COMMUNITY COLLEGE		13 •
MIDDLETOWN	NEW JERSEY	13
BROWN UNIVERSITY		1,942 •
PROVIDENCE	RI	1,942
CALIFORNIA INSTITUTE OF TECHNOLOGY		5,355 •
FORT HUACHUCA	ARIZONA	155
PASADENA	CALIFORNIA	5,200
CALIFORNIA STATE COLLEGE		35 •
HAYWARD	CALIFORNIA	35
CALIFORNIA STATE OF		1,531 •
BERKELEY	CALIFORNIA	1,499
SACRAMENTO	CALIFORNIA	32
CALIFORNIA STATE UNIVERSITY		92 •
LONG BEACH	CALIFORNIA	43
SACRAMENTO	CALIFORNIA	49
CALIFORNIA UNIVERSITY OF		35,345 •
BERKELEY	CALIFORNIA	8,627
DAVIS	CALIFORNIA	402
IRVINE	CALIFORNIA	1,591
LA JOLLA	CALIFORNIA	12,151
LOS ANGELES	CALIFORNIA	4,546
RIVERSIDE	CALIFORNIA	145
SAN DIEGO	CALIFORNIA	1,042
SAN FRANCISCO	CALIFORNIA	640
SANTA BARBARA	CALIFORNIA	1,993
SANTA CRUZ	CALIFORNIA	170
SEPULVEDA	CALIFORNIA	20
WRIGHT PATTERS	OHIO	4,018
CALIFORNIA UNIVERSITY REGENTS OF		364 •
IRVINE	CALIFORNIA	125
LA JOLLA	CALIFORNIA	75
SAN FRANCISCO	CALIFORNIA	164
CARNEGIE INSTITUTION OF WASHINGTON		145 •
WASHINGTON	DC	145
CARNEGIE MELLON UNIVERSITY		10,028 •
PITTSBURGH	PA	10,028
CASE WESTERN RESERVE UNIVERSITY		1,744
CLEVELAND	OHIO	1,744
CATHOLIC UNIVERSITY OF AMERICA		715
WASHINGTON	DC	715
CENTER FOR BLOOD RESEARCH		79
BOSTON	MASS	79
CENTER FOR POLICY RESEARCH		38 •
NEW YORK	NEW YORK	38
CENTRAL FLORIDA UNIVERSITY OF		67
ORLANDO	FLORIDA	67
CENTRAL STATE UNIVERSITY		76 •
WILBERFORCE	OHIO	76
CHARLES STARK DRAPER LABS INC		33,864
CAMBRIDGE	MASS	33,864
CHEMICAL INDUSTRY INST TOXICOLOGY		25
RESEARCH TRIAN	NCAR	25
CHICAGO MEDICAL SCHOOL		75 •
CHICAGO	ILLINOIS	75
CHICAGO UNIVERSITY		696 •
CHICAGO	ILLINOIS	696
CHRIST HOSPITAL INST MED RESEARCH		93 •
CINCINNATI	OHIO	93
CINCINNATI UNIVERSITY OF		798 •
CINCINNATI	OHIO	798
CITY OF HOPE MEDICAL CENTER		52 •
DUARTE	CALIFORNIA	52
CITY UNIVERSITY OF NEW YORK		699 •
FLUSHING	NEW YORK	72
NEW YORK	NEW YORK	627
CLAREMONT COLLEGES & UNIV CENTER		26
CLAREMONT	CALIFORNIA	26
CLARK UNIVERSITY		95 •
WORCESTER	MASS	95
CLARKSON COLLEGE OF TECHNOLOGY		292 •
POTSDAM	NEW YORK	292
CLEMSON UNIVERSITY		1,273 •
CLEMSON	SCAR	1,273
COLLINS WILLIAM INC		57 •
ST CLOUD	FLORIDA	57
COLORADO SCHOOL OF MINES		728 •
GOLDEN	COLORADO	728

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
COLORADO STATE UNIVERSITY		1,806 *
FORT COLLINS	COLORADO	1,806
COLORADO UNIVERSITY		2,073 *
BOULDER	COLORADO	1,757
COLORADO SPRIN	COLORADO	55
DENVER	COLORADO	261
COLUMBIA UNIVERSITY		5,468 *
NEW YORK	NEW YORK	4,134
PALISADES	NEW YORK	1,334
CONNECTICUT UNIVERSITY OF		1,241 *
FARMINGTON	CONN	268
STORRS	CONN	973
CONSORTIUM UNIVERSITIES WASH METRO		502 *
WASHINGTON	DC	502
COORDINATING RESEARCH COUNCIL INC		145 *
ATLANTA	GEORGIA	145
CORNELL UNIVERSITY		4,872 *
ITHACA	NEW YORK	4,584
NEW YORK	NEW YORK	288
DARTMOUTH COLLEGE		283 *
HANOVER	NH	283
DAYTON UNIVERSITY OF		13,505 *
KIRTLAND AFB	NEW MEXICO	201
WILLIAMS AFB	ARIZONA	1,604
EDWARDS AFB	CALIFORNIA	277
DAYTON	OHIO	8,493
WRIGHT PATTERS	OHIO	2,930
DELAWARE UNIVERSITY OF		566 *
NEWARK	DELAWARE	566
DENISON UNIVERSITY		40 *
GRANVILLE	OHIO	40
DENVER UNIVERSITY OF		2,635 *
DENVER	COLORADO	2,635
DETROIT UNIVERSITY OF		246 *
DETROIT	MICHIGAN	246
DISTRICT COLUMBIA UNIVERSITY OF		48 *
WASHINGTON	DC	48
DREXEL UNIVERSITY		1,230 *
PHILADELPHIA	PA	1,230
DUKE UNIVERSITY		1,390 *
DURHAM	NCAR	1,390
E E G SYSTEMS LABORATORY		253 *
SAN FRANCISCO	CALIFORNIA	253
EAST CAROLINA UNIVERSITY		74 *
GREENVILLE	NCAR	74
EINSTEIN ALBERT COLLEGE OF MEDICIN		128 *
BRONX	NEW YORK	128
EMMANUEL COLLEGE		955 *
LEXINGTON	MASS	955
EMORY UNIVERSITY		38 *
ATLANTA	GEORGIA	38
ENVIRONMENTAL RSCH INST OF MICH		5,505 *
ANN ARBOR	MICHIGAN	5,505
FAIRLEIGH DICKINSON UNIVERSITY		114 *
HACKENSACK	NEW JERSEY	114
FLORIDA ATLANTIC UNIVERSITY		97 *
BOCA RATON	FLORIDA	97
FLORIDA DEPARTMENT OF NATURAL RES		13
TALLAHASSEE	FLORIDA	13
FLORIDA INSTITUTE OF TECHNOLOGY		20
MELBOURNE	FLORIDA	20
FLORIDA STATE UNIVERSITY		2,786 *
GAINESVILLE	FLORIDA	523
TALLAHASSEE	FLORIDA	2,263
FLORIDA TECHNOLOGICAL UNIVERSITY		1,132
ORLANDO	FLORIDA	1,132
FLORIDA UNIVERSITY		2,143 *
GAINESVILLE	FLORIDA	2,143
FOREIGN POLICY RESEARCH INSTITUTE		74
PHILADELPHIA	PA	74
FRANKLIN INSTITUTE OF PENNSYLVANIA		153
PHILADELPHIA	PA	153
FRANKLIN INSTITUTE RESEARCH LAB		537
PHILADELPHIA	PA	537
GEOPHYSICAL INSTITUTE OF ALASKA		256 *
COLLEGE	ALASKA	162
FAIRBANKS	ALASKA	94
GEORGE WASHINGTON UNIVERSITY		2,736 *
WASHINGTON	DC	2,736
GEORGETOWN UNIVERSITY		1,730
WASHINGTON	DC	1,730
GEORGIA INSTITUTE TECH		3,789
ATLANTA	GEORGIA	3,789
GEORGIA STATE COLLEGE		36
ATLANTA	GEORGIA	36
GEORGIA TECH RESEARCH INSTITUTE		26,689
ATLANTA	GEORGIA	26,689
GEORGIA UNIVERSITY OF		388
ATHENS	GEORGIA	388
GORGAS MEMORIAL INSTITUTE OF TROPI		209
WASHINGTON	DC	209
GOVERNORS STATE UNIVERSITY		84 *
PARK FOREST	ILLINOIS	84
GULF SOUTH RESEARCH INSTITUTE		106
BATON ROUGE	LOUISIANA	106
HAHNEMANN MEDICAL COLLEGE & HOSPIT		283 *
PHILADELPHIA	PA	283
HARBOR GENERAL HOSPITAL		40
TORRANCE	CALIFORNIA	40

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
HARVARD UNIVERSITY		2,736 *
BOSTON	MASS	60
CAMBRIDGE	MASS	2,673
HAWAII UNIVERSITY OF		2,214 *
HONOLULU	HAWAII	2,214
HOUSTON UNIVERSITY OF		730 *
HOUSTON	TEXAS	730
HOWARD UNIVERSITY		982 *
WASHINGTON	DC	982
HUDSON INSTITUTE		307 *
CROTON ON HUDS	NEW YORK	307
HUMAN RESOURCES RESEARCH ORGN		3,491 *
ALEXANDRIA	VIRGINIA	3,491
ILLINOIS INSTITUTE TECHNOLOGY		44,418 *
ANNAPOLIS	MARYLAND	30,624
CHICAGO	ILLINOIS	12,734
GRIFFISS AFB	NEW YORK	128
ROME	NEW YORK	773
WRIGHT PATTERS	OHIO	159
ILLINOIS UNIVERSITY OF		8,957 *
CHAMPAIGN	ILLINOIS	713
CHICAGO	ILLINOIS	1,377
URBANA	ILLINOIS	6,867
INDIANA UNIVERSITY		439 *
BLOOMINGTON	INDIANA	479
INDIANAPOLIS	INDIANA	40-
INDIANAPOLIS CTR FOR ADVANCE RSCH		22 *
INDIANAPOLIS	INDIANA	22
INSTITUTE COMPARATIVE SOCIETY CULT		97 *
WASHINGTON	DC	97
INSTITUTE FOR ADVANCED STUDY		24 *
PRINCETON	NEW JERSEY	24
INSTITUTE FOR DEFENSE ANALYSIS		18,121 *
ALEXANDRIA	VIRGINIA	10,601
ARLINGTON	VIRGINIA	7,520
INSTITUTE FOR EXP PSYCHIATRY INC		99 *
MERION	PA	99
INSTITUTE FOREIGN POLICY ANALYSIS		407 *
CAMBRIDGE	MASS	407
INSTITUTE MEDICAL RSCH SANTA CLARA		34 *
SAN JOSE	CALIFORNIA	34
INSTITUTE OF GAS TECHNOLOGY		158 *
CHICAGO	ILLINOIS	158
INSTITUTE OF MEDICAL SCIENCES		97 *
SAN FRANCISCO	CALIFORNIA	97
INTERNATIONAL READING ASSOCIATION		46 *
NEWARK	DELAWARE	46
INTERNATIONAL RESEARCH INSTITUTE		250 *
MCLEAN	VIRGINIA	250
INTERNATIONAL SOCIETY OPTICAL ENGR		25 *
BELLINGHAM	WASHINGTON	25
IOWA STATE UNIV OF SCIENCE & TECH		227 *
AMES	IOWA	227
IOWA UNIVERSITY OF		1,703
AMES	IOWA	36
IOWA CITY	IOWA	1,667
ISSAQUAH HEALTH RESEARCH INSTITUTE		97
ISSAQUAH	WASHINGTON	97
JACKSON STATE UNIVERSITY		192 *
JACKSON	MISS	192
JACKSONVILLE STATE UNIVERSITY		51
JACKSONVILLE	ALABAMA	51
JOHN CARROLL UNIVERSITY		166
CLEVELAND	OHIO	166
JOHNS HOPKINS UNIVERSITY		235,517 *
BALTIMORE	MARYLAND	2,055
LAUREL	MARYLAND	233,462
KANSAS STATE FORESTER		35- *
MANHATTAN	KANSAS	35-
KANSAS STATE UNIVERSITY		293 *
MANHATTAN	KANSAS	293
KANSAS UNIVERSITY OF		1,287 *
KANSAS CITY	KANSAS	248
LAWRENCE	KANSAS	961
KANSAS CITY	MISSOURI	78
KENTUCKY UNIVERSITY OF		191 *
LEXINGTON	KENTUCKY	191
KNOWLEDGE SYSTEMS INSTITUTE		15
GLENCOE	ILLINOIS	15
LA JOLLA INSTITUTE		1,094
LA JOLLA	CALIFORNIA	1,094
LAWRENCE LIVERMORE LAB		125 *
LIVERMORE	CALIFORNIA	125
LEHIGH UNIVERSITY		2,034 *
BETHLEHEM	PA	2,034
LOMA LINDA UNIVERSITY		13 *
LOMA LINDA	CALIFORNIA	13
LOUISIANA STATE UNIVERSITY OF		1,070 *
BATON ROUGE	LOUISIANA	1,022
NEW ORLEANS	LOUISIANA	48
LOUISVILLE UNIVERSITY OF		138 *
LOUISVILLE	KENTUCKY	138
LOWELL UNIVERSITY OF		542 *
LOWELL	MASS	542
MARINE BIOLOGICAL LABORATORY		52 *
WOODS HOLE	MASS	52
MARYLAND UNIVERSITY OF		7,237 *
BALTIMORE	MARYLAND	2,645
COLLEGE PARK	MARYLAND	4,532
FORT MEADE	MARYLAND	60

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
MASSACHUSETTS GENERAL HOSPITAL		48 *
BOSTON	MASS	48
MASSACHUSETTS INSTITUTE TECHNOLOGY		216,562 *
CAMBRIDGE	MASS	28,125
LEXINGTON	MASS	188,437
MASSACHUSETTS UNIVERSITY OF		3,433 *
AMHERST	MASS	3,206
WORCESTER	MASS	227
MAYO FOUNDATION		393 *
ROCHESTER	MINNESOTA	393
MEDICAL COLLEGE OF GEORGIA		133 *
AUGUSTA	GEORGIA	133
MEDICAL COLLEGE OF OHIO		202 *
TOLEDO	OHIO	202
MEDICAL COLLEGE OF PENNSYLVANIA		65 *
PHILADELPHIA	PA	65
MEDICAL COLLEGE OF WISCONSIN		114 *
MILWAUKEE	WISCONSIN	114
MIAMI UNIVERSITY		152 *
WRIGHT PATTERS	OHIO	152
MIAMI UNIVERSITY OF		2,752 *
CORAL GABLES	FLORIDA	2,279
MIAMI	FLORIDA	473
MICHAEL REESE RESEARCH FOUNDATION		232 *
CHICAGO	ILLINOIS	232
MICHIGAN STATE UNIVERSITY		1,619 *
EAST LANSING	MICHIGAN	1,619
MICHIGAN TECHNOLOGICAL UNIVERSITY		1,231 *
HOUGHTON	MICHIGAN	1,231
MICHIGAN UNIVERSITY OF		4,095 *
ANN ARBOR	MICHIGAN	3,980
PONTIAC	MICHIGAN	115
MIDWEST RESEARCH INSTITUTE		577 *
KANSAS CITY	MISSOURI	577
MILITARY OPERATIONS RESEARCH SOC		75 *
ALEXANDRIA	VIRGINIA	75
MINNESOTA UNIVERSITY OF		2,459 *
MINNEAPOLIS	MINNESOTA	1,409
ST PAUL	MINNESOTA	1,050
MISSISSIPPI STATE UNIVERSITY		278 *
COLUMBUS	MISS	38
MISSISSIPPI CI	MISS	28
STATE COLLEGE	MISS	212
MISSISSIPPI UNIVERSITY OF		614 *
JACKSON	MISS	14
UNIVERSITY	MISS	600
MISSOURI UNIVERSITY OF		963 *
COLUMBIA	MISSOURI	552
KANSAS CITY	MISSOURI	147
ROLLA	MISSOURI	264
MITRE CORP		167,064
BEDFORD	MASS	166,876
MCLEAN	VIRGINIA	188
MONELL CHEMICAL SENSES CENTER		63
PHILADELPHIA	PA	63
MONTANA STATE UNIVERSITY		272
BOZEMAN	MONTANA	272
MOREHOUSE COLLEGE		50
ATLANTA	GEORGIA	50
MORRIS BROWN COLLEGE		35
ATLANTA	GEORGIA	35
NATIONAL COUNCIL ON RADN PROT MEAS		15
WASHINGTON	DC	15
NATIONAL COUNCIL SOVIET EAST EUROP		670
WASHINGTON	DC	670
NATIONAL GRADUATE UNIVERSITY		15
WASHINGTON	DC	15
NATIONAL INSTITUTE PUBLIC POLICY		442
MCLEAN	VIRGINIA	442
NEBRASKA UNIVERSITY OF		486
LINCOLN	NEBRASKA	299
OMAHA	NEBRASKA	187
NEVADA UNIVERSITY OF		230 *
RENO	NEVADA	230
NEW HAMPSHIRE UNIVERSITY OF		325 *
DURHAM	NH	325
NEW JERSEY COLLEGE MEDICINE DENTIS		421 *
NEWARK	NEW JERSEY	421
NEW JERSEY INSTITUTE OF TECHNOLOGY		65
NEWARK	NEW JERSEY	65
NEW MEXICO INSTITUTE MINING & TECH		1,340
SOCORRO	NEW MEXICO	1,340
NEW MEXICO STATE UNIVERSITY		11,745 *
LAS CRUCES	NEW MEXICO	2,399
WHITE SANDS MS	NEW MEXICO	9,346
NEW MEXICO UNIVERSITY OF		6,566 *
ALBUQUERQUE	NEW MEXICO	971
KIRTLAND AFB	NEW MEXICO	5,570
LAS CRUCES	NEW MEXICO	25
NEW ORLEANS UNIVERSITY OF		112
NEW ORLEANS	LOUISIANA	112
NEW YORK BLOOD CENTER INC		79
NEW YORK	NEW YORK	79
NEW YORK INSTITUTE OF TECHNOLOGY		100
OLD WESTBURY	NEW YORK	100
NEW YORK POLYTECHNIC INSTITUTE		1,626
BROOKLYN	NEW YORK	1,561
NEW YORK	NEW YORK	65
NEW YORK STATE UNIV RESEARCH FOUND		2,314
ALBANY	NEW YORK	2,119
BINGHAMTON	NEW YORK	88
BUFFALO	NEW YORK	72
STONY BROOK	NEW YORK	35

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
NEW YORK STATE UNIVERSITY OF	137 *
ALBANY NEW YORK	66
NEW YORK NEW YORK	57
STONY BROOK NEW YORK	14
NEW YORK UNIVERSITY	1,886 *
NEW YORK NEW YORK	1,886
NEW YORK ZOOLOGICAL SOCIETY	91 *
BROOKLYN NEW YORK	91
NORTH CAROLINA AGRI & TECH STATE U	460 *
GREENSBORO NCAR	460
NORTH CAROLINA STATE UNIVERSITY	1,718 *
RALEIGH NCAR	1,718
NORTH CAROLINA UNIVERSITY OF	1,676 *
CHAPEL HILL NCAR	1,637
WILMINGTON NCAR	39
NORTH DAKOTA UNIVERSITY OF	27 *
GRAND FORKS NDAK	27
NORTH TEXAS STATE UNIVERSITY	246 *
DENTON TEXAS	246
NORTHEASTERN RESEARCH FOUNDATION	352 *
BOOTHBAY HARBO MAINE	352
NORTHEASTERN UNIVERSITY	1,920 *
BOSTON MASS	1,920
NORTHWESTERN UNIVERSITY	1,916 *
EVANSTON ILLINOIS	1,916
NOTRE DAME UNIVERSITY OF	243 *
NOTRE DAME INDIANA	243
NOVA UNIVERSITY OF ADVANCED TECH	85 *
FORT LAUDERDAL FLORIDA	63
MELBOURNE FLORIDA	22
OAKLAND UNIVERSITY	252 *
ROCHESTER MICHIGAN	252
OHIO STATE OF	31 *
COLUMBUS OHIO	31
OHIO STATE UNIV RESERCH FOUNDATION	4,674 *
COLUMBUS OHIO	4,674
OHIO STATE UNIVERSITY THE	610 *
COLUMBUS OHIO	610
OHIO UNIVERSITY	30 *
ATHENS OHIO	30
OHIO WESLEYAN UNIVERSITY	50 *
DELAWARE OHIO	50
OKLAHOMA STATE UNIVERSITY OF	2,746 *
EGLIN AFB FLORIDA	1,455
STILLWATER OKLAHOMA	1,291
OKLAHOMA UNIVERSITY OF	604 *
NORMAN OKLAHOMA	518
OKLAHOMA CITY OKLAHOMA	86
OLD DOMINION COLLEGE	93 *
NORFOLK VIRGINIA	93
OLD DOMINION UNIVERSITY RSCH FOUND	269 *
NORFOLK VIRGINIA	269
ORANGE COUNTY POLLUTION CONTROL BD	11 *
ORLANDO FLORIDA	11
OREGON GRADUATE CTR FOR STUDY RES	199 *
BEAVERTON OREGON	199
OREGON STATE UNIVERSITY	3,485 *
CORVALLIS OREGON	3,485
OREGON UNIVERSITY OF	390 *
EUGENE OREGON	303
PORTLAND OREGON	87
PACIFIC NORTHWEST RSCH FOUNDATION	94
SEATTLE WASHINGTON	94
PALISADES GEOPHYSICAL INSTITUTE	831
BERMUDA	70-
WEST NYACK NEW YORK	901
PALISADES INSTITUTE	962 *
NEW YORK NEW YORK	962
PENNSYLVANIA STATE UNIVERSITY	12,252
HERSHEY PA	32
STATE COLLEGE PA	736
UNIVERSITY PAR PA	11,484
PENNSYLVANIA UNIVERSITY OF	3,790
WASHINGTON DC	127
PHILADELPHIA PA	3,663
PETER BENT BRIGHAM HOSPITAL	359
BOSTON MASS	359
PHILADELPHIA CHILDRENS HOSPITAL	94 *
PHILADELPHIA PA	94
PIERCE JOHN B FOUNDATION OF CONN	80 *
NEW HAVEN CONN	80
PITTSBURGH UNIVERSITY OF	1,617
PITTSBURGH PA	1,617
POLYTECHNIC INSTITUTE OF NEW YORK	124
BROOKLYN NEW YORK	124
PORTLAND STATE UNIVERSITY	117 *
PORTLAND OREGON	117
POTOMAC INSTITUTE FOR ECON RESEARC	117 *
WASHINGTON DC	117
PRINCETON UNIVERSITY	2,858 *
PRINCETON NEW JERSEY	2,858
PUERTO RICO UNIVERSITY OF	90
SAN JUAN PUERTO RCO	90
PURDUE RESEARCH FOUNDATION	2,430 *
LAFAYETTE INDIANA	732
WEST LAFAYETTE INDIANA	1,698
PURDUE UNIVERSITY	480 *
WEST LAFAYETTE INDIANA	480
QUEENS HOSPITAL MEDICAL CENTER	87 *
HONOLULU HAWAII	87

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
RAND CORP	22,844 *
SANTA MONICA CALIFORNIA	22,844
REGIS COLLEGE	350 *
WESTON MASS	350
RENSSELAER POLYTECHNIC INSTITUTE	2,305 *
TROY NEW YORK	2,305
RESEARCH INSTITUTE OF COLORADO	23 *
FORT COLLINS COLORADO	23
RESEARCH TRIANGLE INSTITUTE	1,080 *
RESEARCH TRIAN NCAR	1,080
RHODE ISLAND UNIVERSITY OF	2,018 *
KINGSTON RI	2,018
RICE UNIVERSITY	450 *
HOUSTON TEXAS	450
RIVERSIDE RESEARCH INSTITUTE	3,811 *
ARLINGTON VIRGINIA	338
NEW YORK NEW YORK	3,473
ROCHESTER INSTITUTE OF TECHNOLOGY	71 *
ROCHESTER NEW YORK	71
ROCHESTER UNIVERSITY OF	6,876 *
ARLINGTON VIRGINIA	5,291
ROCHESTER NEW YORK	1,585
RUTGERS UNIVERSITY	1,024 *
NEW BRUNSWICK NEW JERSEY	976
PISCATAWAY NEW JERSEY	48
S R I INTERNATIONAL	36,247 *
MENLO PARK CALIFORNIA	36,247
SAINT JOSEPH COLLEGE MARYLAND	86 *
PHILADELPHIA PA	86
SAINT LOUIS UNIVERSITY	270 *
ST LOUIS MISSOURI	270
SALK INSTITUTE THE	2,346 *
SWIFTWATER PA	2,224
SAN DIEGO CALIFORNIA	122
SAN DIEGO SOCIETY OF NATURAL HISTO	29 *
SAN DIEGO CALIFORNIA	29
SAN DIEGO STATE UNIV FOUNDATION	107 *
SAN DIEGO CALIFORNIA	107
SAN DIEGO UNIVERSITY FOUNDATION	77 *
SAN DIEGO CALIFORNIA	77
SAN FRANCISCO UNIVERSITY OF	36 *
SAN FRANCISCO CALIFORNIA	36
SAN JOSE STATE UNIVERSITY FOUND	341 *
LONG BEACH CALIFORNIA	166
SAN JOSE CALIFORNIA	175
SCRIPPS CLINIC RESEARCH	229 *
LA JOLLA CALIFORNIA	229
SIDNEY FARBER CANCER INSTITUTE	117 *
BOSTON MASS	117
SOCIETY INDUSTRIAL APPLIED MATH	44
PHILADELPHIA PA	44
SOCIETY OF AUTOMOTIVE ENGINEERS	95
WARRENDALE PA	95
SOUTH CAROLINA UNIVERSITY OF	281
COLUMBIA SCAR	281
SOUTH DAKOTA SCHOOL OF MINES TECH	20
RAPID CITY SDAK	20
SOUTH DAKOTA STATE UNIVERSITY	16
BROOKINGS SDAK	16
SOUTH DAKOTA UNIVERSITY OF	20
VERMILLION SDAK	20
SOUTH FLORIDA UNIVERSITY OF	303
TAMPA FLORIDA	303
SOUTHEASTERN CTR ELECT ENGR EDUC	[illegible]
ORLANDO FLORIDA	149
ST CLOUD FLORIDA	[illegible]
WRIGHT PATTERS OHIO	196
SOUTHEASTERN MASS TECH INSTITUTE	10
NORTH DARTMOUT MASS	10
SOUTHERN CALIFORNIA UNIVERSITY OF	9,854
LOS ANGELES CALIFORNIA	9,700
MARINA DEL REY CALIFORNIA	154
SOUTHERN ILLINOIS UNIVERSITY	55
EDWARDSVILLE ILLINOIS	55
SOUTHERN METHODIST UNIVERSITY OF	508
DALLAS TEXAS	508
SOUTHERN RESEARCH INSTITUTE	3,695
BIRMINGHAM ALABAMA	3,695
SOUTHWEST FOUNDATION FOR RESEARC	368
SAN ANTONIO TEXAS	368
SOUTHWEST RESEARCH INSTITUTE	8,754
SAN ANTONIO TEXAS	8,754
SOUTHWESTERN LOUISIANA UNIVERSITY	16
LAFAYETTE LOUISIANA	16
STANFORD UNIVERSITY	22,753
MENLO PARK CALIFORNIA	15
STANFORD CALIFORNIA	22,738
STEVENS INSTITUTE OF TECHNOLOGY	1,469
HOBOKEN NEW JERSEY	1,469
SYRACUSE RESEARCH CORP	2,781
SYRACUSE NEW YORK	2,781
SYRACUSE UNIVERSITY	1,003
ROME NEW YORK	234
SYRACUSE NEW YORK	769
SYRACUSE UNIVERSITY RESEARCH CORP	368
SYRACUSE NEW YORK	368
TEMPLE UNIVERSITY	353
PHILADELPHIA PA	353

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
TENNESSEE STATE UNIVERSITY		66 *
NASHVILLE	TENNESSEE	66
TENNESSEE TECHNOLOGICAL UNIVERSITY		30 *
COOKEVILLE	TENNESSEE	30
TENNESSEE UNIVERSITY OF		1,531 *
KNOXVILLE	TENNESSEE	1,140
MEMPHIS	TENNESSEE	19
TULLAHOMA	TENNESSEE	376
TEXAS A & M RESEARCH FOUNDATION		2,193 *
COLLEGE STATIO	TEXAS	2,193
TEXAS A & M UNIVERSITY		430 *
COLLEGE STATIO	TEXAS	430
TEXAS CHRISTIAN UNIVERSITY		229 *
FORT WORTH	TEXAS	229
TEXAS TECHNOLOGICAL COLLEGE		1,303 *
LUBBOCK	TEXAS	1,303
TEXAS UNIVERSITY OF		15,720 *
	ANTARCTICA	211
ARLINGTON	TEXAS	119
AUSTIN	TEXAS	14,148
DALLAS	TEXAS	142
EL PASO	TEXAS	30
GALVESTON	TEXAS	71
RICHARDSON	TEXAS	380
SAN ANTONIO	TEXAS	590
TUFTS UNIVERSITY		83 *
MEDFORD	MASS	83
TULANE UNIVERSITY OF LOUISIANA		62 *
COVINGTON	LOUISIANA	62
TULSA UNIVERSITY OF		49 *
TULSA	OKLAHOMA	49
TUSKEGEE INSTITUTE		43 *
TUSKEGEE	ALABAMA	43
UNDERSEA MEDICAL SOCIETY INC		124 *
BETHESDA	MARYLAND	124
UTAH STATE UNIVERSITY		9,431 *
LOGAN	UTAH	9,431
UTAH UNIVERSITY OF		2,387 *
SALT LAKE CITY	UTAH	2,387
UTAH UNIVERSITY RESEARCH INSTITUTE		24 *
SALT LAKE CITY	UTAH	24
VANDERBILT UNIVERSITY		585 *
NASHVILLE	TENNESSEE	585
VERMONT UNIVERSITY OF		288 *
BURLINGTON	VERMONT	288
VILLANOVA UNIVERSITY		10 *
VILLANOVA	PA	10
VIRGINIA COMMONWEALTH UNIVERSITY		780 *
RICHMOND	VIRGINIA	780
VIRGINIA INST OF MARINE SCIENCES		17 *
GLOUCESTER POI	VIRGINIA	17
VIRGINIA MASON RESEARCH CENTER		[illegible]
SEATTLE	WASHINGTON	[illegible]
VIRGINIA POLYTECHNIC INSTITUTE		[illegible]
BLACKSBURG	VIRGINIA	[illegible]
VIRGINIA UNIVERSITY OF		1,415
CHARLOTTESVILL	VIRGINIA	1,415
WAKE FOREST UNIVERSITY		67
WINSTON SALEM	NCAR	67
WASHINGTON BOOKER T FOUNDATION		[illegible]
WASHINGTON	DC	[illegible]
WASHINGTON STATE UNIVERSITY		957
PULLMAN	WASHINGTON	957
WASHINGTON UNIVERSITY		849
ST LOUIS	MISSOURI	849
WASHINGTON UNIVERSITY OF		10,406
SEATTLE	WASHINGTON	[illegible]
WAYNE STATE UNIVERSITY		[illegible]
DETROIT	MICHIGAN	[illegible]
WEBB INSTITUTE OF NAVAL ARCH		25
GLEN COVE	NEW YORK	[illegible]
WENTWORTH INSTITUTE		[illegible]
BOSTON	MASS	[illegible]
WEST CHESTER STATE COLLEGE		51 *
WEST CHESTER	PA	51
WEST VIRGINIA DEPT NATRL RESOURCES		10 *
LOGAN	WVA	10
WEST VIRGINIA UNIVERSITY		102 *
MORGANTOWN	WVA	102
WESTERN KENTUCKY UNIVERSITY		88 *
BOWLING GREEN	KENTUCKY	88
WICAT INC		98 *
OREM	UTAH	98
WILLIAMS COLLEGE		75
WILLIAMSTOWN	MASS	75
WISCONSIN UNIVERSITY OF		4,611
MADISON	WISCONSIN	4,577
PLATTEVILLE	WISCONSIN	34
WOODS HOLE OCEANOGRAPHIC INST		11,798
WOODS HOLE	MASS	11,798
WORCESTER POLYTECHNIC INSTITUTE		251
WORCESTER	MASS	251
WRIGHT STATE UNIVERSITY		782
DAYTON	OHIO	380
WRIGHT PATTERS	OHIO	402
WYOMING UNIVERSITY OF		[illegible]
LARAMIE	WYOMING	[illegible]
YALE UNIVERSITY		[illegible]
NEW HAVEN	CONN	[illegible]

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $10,000 for RDT&E Work: FY 1982 (Concluded)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
YESHIVA UNIVERSITY	71 *		
BRONX NEW YORK	26		
NEW YORK NEW YORK	45		
	1,499,874		

Table 2. U.S. Government Agencies Receiving DOD Prime Contract Awards Over $10,000 for RDT&E Work: FY 1982

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
AMERICAN EMBASSY		70		
	JAPAN	70		
MARITIME ADMINISTRATION		30		
WOODBINE	MARYLAND	30		
NATIONAL ACADEMY OF SCIENCES		9,068		
WASHINGTON	DC	8,467		
ABERDEEN PROV	MARYLAND	135		
BETHESDA	MARYLAND	385		
MONTEREY	CALIFORNIA	81		
NATIONAL SCIENCE FOUNDATION		1,055		
WASHINGTON	DC	1,055		
SMITHSONIAN INSTITUTION		567		
WASHINGTON	DC	358		
CAMBRIDGE	MASS	209		
UNITED STATES AGRICULTURE DEPT		74		
GAINESVILLE	FLORIDA	74		
UNITED STATES COMMERCE DEPT		2,715		
WASHINGTON	DC	1,326		
BOULDER	COLORADO	1,216		
GAITHERSBURG	MARYLAND	54		
ROCKVILLE	MARYLAND	79		
SEATTLE	WASHINGTON	40		
UNITED STATES DEPT OF EDUCATION		20		
WASHINGTON	DC	20		
UNITED STATES ENERGY DEPT		760		
ARGONNE	ILLINOIS	97		
OAK RIDGE	TENNESSEE	93		
RICHLAND	WASHINGTON	150		
OAKLAND	CALIFORNIA	140		
UNITED STATES LABOR DEPT		75		
WASHINGTON	DC	75		
UNITED STATES NATL AERO SPACE ADM		20,248		
LANGLEY AFB	VIRGINIA	72		
RIDGELEY	WVA	20,018		
PASADENA	CALIFORNIA	158		
UNITED STATES OFF OF PERSONNEL MGT		15		
WASHINGTON	DC	15		
UNITED STATES PATENT OFFICE		74		
WASHINGTON	DC	74		
		34,771		

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $10,000 for RDT&E Work: FY 1982

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
ALBERTA UNIVERSITY CANADA	15 * 15
ATHENS UNIVERSITY OF GREECE	4 * 4
BEN GURION UNIVERSITY OF THE NEGEV ISRAEL	15 * 15
BRISTOL UNIVERSITY OF UN KINGDOM	53 * 53
BRUNEL UNIVERSITY UN KINGDOM	98 * 98
CAIRO UNIVERSITY EGYPT	12 * 12
CAMBRIDGE UNIVERSITY OF UN KINGDOM	103 * 103
CHELSEA COLLEGE UN KINGDOM	10 * 10
CONCORDIA UNIVERSITY CANADA	271 * 271
DENMARK TECHNICAL UNIVERSITY OF DENMARK	17 * 17
DENMARK UNIVERSITY OF DAHOMEY	19 * 19
EAST ANGLIA UNIVERSITY OF UN KINGDOM	12 * 12
EDINBURGH UNIVERSITY OF UN KINGDOM	25 * 25
FEDERAL REPUBLIC OF GERMANY EGLIN AFB FLORIDA	83 * 83
GLASGOW UNIVERSITY OF UN KINGDOM	36 * 36
HANNOVER UNIVERSITAET GERMANY	242 * 242
HEBREW UNIVERSITY ISRAEL	102 * 102
IMPERIAL COLLEGE OF SCIENCE & TECH UN KINGDOM	247 * 247
INSTITUT FUER INFORMATIK SWITZERLND	18 * 18
INSTITUTE DE CHIMIE PHYSIQUE SWITZERLND	27 * 27
INSTITUTE DI MACCHINE ITALY	28 * 28
INSTITUTO DI CHIMICA FISICA ITALY	14 * 14
INSTITUTO DI ELETTRONICA & COMM ITALY	31 * 31
INVERESK RESEARCH INTERNATIONAL UN KINGDOM	211 * 211
ISRAEL INSTITUTE OF TECHNOLOGY ISRAEL	47 * 47
LEEDS UNIVERSITY OF UN KINGDOM	21 * 21
LIVERPOOL UNIVERSITY OF UN KINGDOM	20 * 20
LONDON UNIVERSITY OF UN KINGDOM	115 115
MANCHESTER UNIVERSITY UN KINGDOM	20 20
MCGILL UNIVERSITY CANADA	55 55
NORTH WALES UNIVERSITY COLLEGE OF UN KINGDOM	27 * 27
OPEN UNIVERSITY THE UN KINGDOM	24 24
OXFORD UNIVERSITY UN KINGDOM	21 21
ROYAL COLLEGE OF MILITARY SCIENCE UN KINGDOM	25 25
SALFORD UNIVERSITY OF UN KINGDOM	58 58
SOCIETE E C A FRANCE	267 267
STUTTGART UNIVERSITY OF GERMANY	87 87
SUSSEX UNIVERSITY OF UN KINGDOM	20 20
TECHNION RESEARCH & DEV FOUNDATION ISRAEL	52 52
TEL AVIV UNIVERSITY GERMANY ISRAEL	201 24 177
TORONTO UNIVERSITY OF CANADA	142 142
UNITED KINGDOM MINISTRY OF DEFENCE UN KINGDOM	320 * 320
UNIVERSIDAD AUTONOMA SPAIN	11 11
UNIVERSITE RENE DESCARTES FRANCE	10 10
WAIKATO UNIVERSITY OF N ZEALAND	30 30
WALES UNIVERSITY COLLEGE OF UN KINGDOM	25 25
WESTERN ONTARIO UNIVERSITY OF THE CANADA	94 94

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $10,000 for RDT&E Work: FY 1982 (Concluded)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
YORK UNIVESITY	20 *		
CANADA	20		
	3,405		

Department of Defense

EDUCATIONAL AND NONPROFIT INSTITUTIONS RECEIVING PRIME CONTRACT AWARDS FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Fiscal Year 1983

Issued Annually by

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Operations and Reports

INTRODUCTION

This report presents data on Department of Defense (DOD) prime contract awards over $25,000 for research, development, test, and evaluation (RDT&E) made to educational and nonprofit institutions during Fiscal Year (FY) 1983. The data are presented in three tables, each of which lists contractors alphabetically and gives the net value of all awards to the contractor as well as the value of the awards to each of the contractor's locations, where applicable. Table 1 covers awards to educational and other nonprofit institutions in the United States, Table 2 covers awards to U.S. government agencies, and data on awards to foreign institutions and government agencies are provided in Table 3.

NOTES ON COVERAGE

The dollar amounts shown here include prime contract awards over $25,000 for RDT&E work only. Data on awards for other services, such as training, and on any supplies furnished by the contractor in support of research being done are excluded. Contract awards for civil functions are included in these data. Civil functions encompass planning, programming, designing, constructing, and operating Federal water resources projects for navigation, flood control, hydroelectric power production, water supply, and other related activities.

The locations shown in the tables are the sites where the work was to be performed. Normally, this is a facility of the institution awarded the contract. However, if the work was scheduled to be performed at a Defense facility, such as an Air Force base, the location shown is that of the Defense facility rather than the institution.

HIGHLIGHTS OF FY 1983 DATA

The following table shows the number of institutions receiving contracts and the net value of the awards, by type of institution, for FY 1982 and FY 1983.

TYPE OF INSTITUTION	FISCAL YEAR			
	1982		1983	
	NUMBER	AMOUNT*	NUMBER	AMOUNT*
TOTAL	387	$1,538	367	$1,761
U.S. INSTITUTIONS — TOTAL	326	1,500	317	1,727
Educational	213	852	204	942
Other Nonprofit	113	648	113	785
U.S. GOVERNMENT AGENCIES	13	35	10	22
FOREIGN INSTITUTIONS AND GOVERNMENT AGENCIES	48	3	40	12

*Amounts in millions.

In FY 1983, educational and nonprofit institutions received DOD prime contract awards over $25,000 for RDT&E totaling $1,761 million compared to $1,538 million in FY 1982. This represents an increase of $223 million or 14.5 percent. Awards for foreign institutions had the largest percentage increase of all institutions, increasing from $3 million in FY 1982 to $12 million in FY 1983, an increase of 300.0 percent. Awards to U.S. institutions had the second largest percentage gain, growing from $1,500 million in FY 1982 to $1,727 million in FY 1983, an increase of 15.1 percent. Awards to U.S. government agencies decreased from $35 million in FY 1982 to $22 million in FY 1983, a decrease of 37.1 percent.

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1983

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ACADEMY OF APPLIED SCIENCE INC		291 •
RALEIGH	NCAR	291
ACCREDITATION BOARD FOR ENG & TECH		26 •
NEW YORK	NEW YORK	26
ADVANCED INTL STUDIES INSTITUTE		400 •
WASHINGTON	DC	400
AEROSPACE CORP		260,474 •
EL SEGUNDO	CALIFORNIA	260,474
AGOURON INSTITUTE THE		156 •
LA JOLLA	CALIFORNIA	156
AKRON UNIVERSITY OF		302 •
AKRON	OHIO	302
ALABAMA A & M UNIVERSITY		157 •
HUNTSVILLE	ALABAMA	110
NORMAL	ALABAMA	47
ALABAMA UNIVERSITY OF		1,464 •
BIRMINGHAM	ALABAMA	409
HUNTSVILLE	ALABAMA	793
NORMAL	ALABAMA	177
UNIVERSITY	ALABAMA	85
ALASKA UNIVERSITY OF		726 •
FAIRBANKS	ALASKA	726
ALBANY MEDICAL COLLEGE UNION UNIV		50 •
ALBANY	NEW YORK	50
AMERICAN COLLEGE TESTING PGM		136 •
IOWA CITY	IOWA	136
AMERICAN DENTAL ASSOCIATION		30 •
CHICAGO	ILLINOIS	30
AMERICAN INSTITUTE BIOLOGICAL		229 •
ARLINGTON	VIRGINIA	229
AMERICAN INSTITUTE FOR RESEARCH		878 •
WASHINGTON	DC	878
AMERICAN RED CROSS		42 •
WASHINGTON	DC	42
AMERICAN REGISTRY OF PATHOLOGY		175 •
WASHINGTON	DC	175
AMERICAN SOCIETY FOR ENGINEERING		767 •
WASHINGTON	DC	767
ANALYTIC SERVICES INC		4,835 •
ARLINGTON	VIRGINIA	4,835
ARIZONA STATE UNIVERSITY		718 •
TEMPE	ARIZONA	718
ARIZONA UNIVERSITY OF		2,981 •
TUCSON	ARIZONA	2,981
ARMOUR PHARMACEUTICAL CO		2,890 •
CHICAGO	ILLINOIS	2,890
ASSOCIATION OF AMERICAN UNIVERSITS		486 •
WASHINGTON	DC	486
ATLANTA UNIVERSITY OF		330 •
ATLANTA	GEORGIA	330
ATLANTIC COUNCIL		30 •
WASHINGTON	DC	30
AUBURN RESEARCH FOUNDATION		34 •
AUBURN	ALABAMA	34
AUBURN UNIVERSITY		904 •
AUBURN	ALABAMA	904
BALL STATE UNIVERSITY		80 •
MUNCIE	INDIANA	80
BATTELLE MEMORIAL INSTITUTE		20,667 •
WASHINGTON	DC	49
ABERDEEN PROV	MARYLAND	896
ALEXANDRIA	VIRGINIA	88
BURLINGTON	VERMONT	45
ATHENS	GEORGIA	34
ATLANTA	GEORGIA	61
COLLEGE PARK	MARYLAND	87
ENGLEWOOD	COLORADO	97
FORT COLLINS	COLORADO	70
BROOKS AFB	TEXAS	101
DOVER	NEW JERSEY	26
WHITE SANDS MS	NEW MEXICO	134
GAINESVILLE	FLORIDA	32
FORT DIX	NEW JERSEY	37
FORT MONMOUTH	NEW JERSEY	47
FORT BELVOIR	VIRGINIA	37
FORT EUSTIS	VIRGINIA	85
FORT MONROE	VIRGINIA	109
CLEVELAND	OHIO	29
COLUMBUS	OHIO	16,720
HAMPTON	VIRGINIA	32
HUNTSVILLE	ALABAMA	287
DALLAS	TEXAS	45
SALT LAKE CITY	UTAH	46
FORT GORDON	GEORGIA	99
MOORESTOWN	NEW JERSEY	38
RICHLAND	WASHINGTON	933
IRVINE	CALIFORNIA	60
LA JOLLA	CALIFORNIA	75
MANHATTAN	KANSAS	218
PISCATAWAY	NEW JERSEY	30
PRINCETON	NEW JERSEY	48
WARRENTON	VIRGINIA	45
PACIFIC	CALIFORNIA	41
RESEARCH TRIAN	NCAR	440
WEST LAFAYETTE	INDIANA	27
SAN DIEGO	CALIFORNIA	30
ST PAUL	MINNESOTA	36
SAN ANTONIO	TEXAS	45
ST LOUIS	MISSOURI	184
BAYLOR UNIVERSITY		349 •
HOUSTON	TEXAS	349
BETH ISRAEL HOSPITAL		88 •
NEW YORK	NEW YORK	88
BOSTON COLLEGE		2,877 •
CHESTNUT HILL	MASS	1,866
HANSCOM AFB	MASS	120
NEWTON	MASS	400
WESTON	MASS	486
BOSTON UNIVERSITY		3,476 •
BOSTON	MASS	3,476

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1983 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
BOWLING GREEN STATE UNIVERSITY		39 *
BOWLING GREEN	OHIO	39
BRANDEIS UNIVERSITY		34 *
WALTHAM	MASS	34
BRIGHAM YOUNG UNIVERSITY		304 *
PROVO	UTAH	304
BROWN UNIVERSITY		2,109 *
PROVIDENCE	RI	2,109
CALIFORNIA INSTITUTE OF TECHNOLOGY		4,808 *
PASADENA	CALIFORNIA	4,808
CALIFORNIA STATE COLLEGE		43 *
HAYWARD	CALIFORNIA	43
CALIFORNIA STATE OF		3,499 *
BERKELEY	CALIFORNIA	3,499
CALIFORNIA STATE UNIVERSITY		67 *
SACRAMENTO	CALIFORNIA	67
CALIFORNIA UNIVERSITY OF		38,356 *
BERKELEY	CALIFORNIA	9,029
DAVIS	CALIFORNIA	386
IRVINE	CALIFORNIA	1,853
LA JOLLA	CALIFORNIA	12,368
LOS ANGELES	CALIFORNIA	7,167
RIVERSIDE	CALIFORNIA	64
SACRAMENTO	CALIFORNIA	30
SAN DIEGO	CALIFORNIA	181
SAN FRANCISCO	CALIFORNIA	1,123
SANTA BARBARA	CALIFORNIA	2,032
SANTA CRUZ	CALIFORNIA	87
WRIGHT PATTERS	OHIO	4,036
CALIFORNIA UNIVERSITY REGENTS OF		127 *
BERKELEY	CALIFORNIA	50
IRVINE	CALIFORNIA	77
CARNEGIE INSTITUTION OF WASHINGTON		165 *
WASHINGTON	DC	165
CARNEGIE MELLON RESEARCH INSTITUTE		302 *
PITTSBURGH	PA	302
CARNEGIE MELLON UNIVERSITY		12,248 *
PITTSBURGH	PA	12,248
CASE WESTERN RESERVE UNIVERSITY		1,878 *
CLEVELAND	OHIO	1,878
CATHOLIC UNIVERSITY OF AMERICA		1,009 *
WASHINGTON	DC	1,009
CENTER FOR BLOOD RESEARCH		79 *
BOSTON	MASS	79
CENTRAL FLORIDA UNIVERSITY OF		160 *
ORLANDO	FLORIDA	160
CENTRAL STATE UNIVERSITY		41 *
WILBERFORCE	OHIO	41
CHARLES STARK DRAPER LABS INC		65,509 *
CAMBRIDGE	MASS	65,509
CHICAGO MEDICAL SCHOOL		75 *
CHICAGO	ILLINOIS	75
CHICAGO UNIVERSITY		856 *
CHICAGO	ILLINOIS	856
CHRIST HOSPITAL INST MED RESEARCH		62 *
CINCINNATI	OHIO	62
CINCINNATI UNIVERSITY OF		772 *
CINCINNATI	OHIO	772
CITY OF HOPE MEDICAL CENTER		126 *
DUARTE	CALIFORNIA	126
CITY UNIV OF NEW YORK RSCH FOUND		183 *
FLUSHING	NEW YORK	70
NEW YORK	NEW YORK	113
CITY UNIVERSITY OF NEW YORK		886 *
BROOKLYN	NEW YORK	193
NEW YORK	NEW YORK	693
CLAREMONT COLLEGES & UNIV CENTER		35 *
CLAREMONT	CALIFORNIA	35
CLARK UNIVERSITY		66 *
WORCESTER	MASS	66
CLARKSON COLLEGE OF TECHNOLOGY		435 *
POTSDAM	NEW YORK	435
CLEMSON UNIVERSITY		1,852 *
CLEMSON	SCAR	1,852
COLORADO SCHOOL OF MINES		988 *
GOLDEN	COLORADO	988
COLORADO STATE UNIVERSITY		1,815 *
FORT COLLINS	COLORADO	1,815
COLORADO UNIVERSITY		2,377 *
BOULDER	COLORADO	1,904
COLORADO SPRIN	COLORADO	114
DENVER	COLORADO	359
COLUMBIA UNIVERSITY		7,189 *
NEW YORK	NEW YORK	6,690
PALISADES	NEW YORK	499
CONNECTICUT UNIVERSITY OF		429 *
FARMINGTON	CONN	67
STORRS	CONN	362
CONSORTIUM UNIVERSITIES WASH METRO		444 *
WASHINGTON	DC	444
COORDINATING RESEARCH COUNCIL INC		92 *
ATLANTA	GEORGIA	92
CORNELL UNIVERSITY		5,227 *
ITHACA	NEW YORK	4,800
NEW YORK	NEW YORK	427
DARTMOUTH COLLEGE		491 *
HANOVER	NH	491
DAYTON UNIVERSITY OF		14,809 *
WILLIAMS AFB	ARIZONA	2,972
EDWARDS AFB	CALIFORNIA	272
DAYTON	OHIO	9,424
WRIGHT PATTERS	OHIO	2,141

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1983 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
DELAWARE UNIVERSITY OF		796 *
NEWARK	DELAWARE	796
DENISON UNIVERSITY		130 *
GRANVILLE	OHIO	130
DENVER RESEARCH INSTITUTE		177 *
DENVER	COLORADO	177
DENVER UNIVERSITY OF		1,698 *
DENVER	COLORADO	1,698
DETROIT UNIVERSITY OF		177 *
DETROIT	MICHIGAN	177
DISTRICT COLUMBIA UNIVERSITY OF		56 *
WASHINGTON	DC	56
DREXEL UNIVERSITY		952 *
PHILADELPHIA	PA	952
DUKE UNIVERSITY		1,247 *
DURHAM	NCAR	1,247
E E G SYSTEMS LABORATORY		313 *
SAN FRANCISCO	CALIFORNIA	313
EAST CAROLINA UNIVERSITY		71 *
GREENVILLE	NCAR	71
EINSTEIN ALBERT COLLEGE OF MEDICIN		169 *
BRONX	NEW YORK	169
EMMANUEL COLLEGE		1,186 *
LEXINGTON	MASS	1,186
EMORY UNIVERSITY		100 *
ATLANTA	GEORGIA	100
ENVIRONMENTAL RESEARCH GROUP INC		200 *
ANN ARBOR	MICHIGAN	200
ENVIRONMENTAL RESEARCH INSTIT MICH		6,400 *
ANN ARBOR	MICHIGAN	6,400
EYE RESEARCH INSTITUTE RETINA FOUN		155 *
BOSTON	MASS	155
FACTORY MUTUAL RESEARCH CORP		72 *
WASHINGTON	DC	72
FLORIDA ATLANTIC UNIVERSITY		48 *
BOCA RATON	FLORIDA	48
FLORIDA STATE UNIVERSITY		2,519 *
GAINESVILLE	FLORIDA	912
TALLAHASSEE	FLORIDA	1,607
FLORIDA TECHNOLOGICAL UNIVERSITY		1,203 *
ORLANDO	FLORIDA	1,203
FLORIDA UNIVERSITY		2,140 *
GAINESVILLE	FLORIDA	2,140
FOUNDATION FOR SOVIET STUDIES		100 *
SILVER SPRING	MARYLAND	100
FRANKLIN INSTITUTE OF PENNSYLVANIA		839 *
PHILADELPHIA	PA	839
GEOPHYSICAL INSTITUTE OF ALASKA		171 *
FAIRBANKS	ALASKA	171
GEORGE WASHINGTON UNIVERSITY		2,524 *
WASHINGTON	DC	2,524
GEORGETOWN UNIVERSITY		1,069 *
WASHINGTON	DC	1,069
GEORGIA INSTITUTE TECH		2,335 *
ATLANTA	GEORGIA	2,335
GEORGIA STATE COLLEGE		30 *
ATLANTA	GEORGIA	30
GEORGIA TECH RESEARCH INSTITUTE		25,180 *
ATLANTA	GEORGIA	25,180
GEORGIA UNIVERSITY OF		866 *
ATHENS	GEORGIA	866
GORGAS MEMORIAL INSTITUTE OF TROPI		214 *
WASHINGTON	DC	214
HAHNEMANN MEDICAL COLLEGE & HOSPIT		145 *
PHILADELPHIA	PA	145
HAMPTON INSTITUTE		49 *
HAMPTON	VIRGINIA	49
HARVARD UNIVERSITY		3,920 *
CAMBRIDGE	MASS	3,920
HASKIN LABORATORIES INC		36 *
NEW HAVEN	CONN	36
HAWAII UNIVERSITY OF		2,128 *
HONOLULU	HAWAII	1,680
PEARL HARBOR N	HAWAII	448
HOUSTON UNIVERSITY OF		996 *
HOUSTON	TEXAS	996
HOWARD UNIVERSITY		275 *
WASHINGTON	DC	275
HUDSON INSTITUTE		487 *
CROTON ON HUDS	NEW YORK	487
HUMAN RESOURCES RESEARCH ORGN		2,599 *
ALEXANDRIA	VIRGINIA	2,599
HUTCHINSON FRED CANCER RESEARCH		68 *
SEATTLE	WASHINGTON	68
ILLINOIS INSTITUTE TECHNOLOGY		42,004 *
ANNAPOLIS	MARYLAND	34,270
LANHAM	MARYLAND	70
CHICAGO	ILLINOIS	6,706
GRIFFISS AFB	NEW YORK	96
ROME	NEW YORK	862
ILLINOIS UNIVERSITY OF		10,426 *
CHAMPAIGN	ILLINOIS	1,920
CHICAGO	ILLINOIS	3,276
URBANA	ILLINOIS	5,230
INDIANA UNIVERSITY		274 *
BLOOMINGTON	INDIANA	316
INDIANAPOLIS	INDIANA	42-

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions In the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1963 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
INDIANA UNIVERSITY FOUNDATION		296 *
BLOOMINGTON	INDIANA	101
INDIANAPOLIS	INDIANA	195
INSTITUTE FOR ACOUSTICAL RESEARCH		48 *
MIAMI	FLORIDA	48
INSTITUTE FOR ADVANCED STUDY		80 *
PRINCETON	NEW JERSEY	80
INSTITUTE FOR DEFENSE ANALYSIS		22,440 *
ALEXANDRIA	VIRGINIA	22,440
INSTITUTE FOR EXP PSYCHIATRY INC		100 *
MERION	PA	100
INSTITUTE FOREIGN POLICY ANALYSIS		337 *
CAMBRIDGE	MASS	337
INSTITUTE MEDICAL RSCH SANTA CLARA		43 *
SAN JOSE	CALIFORNIA	43
INSTITUTE OF APPLIED PHYSIOLOGY		57 *
SEATTLE	WASHINGTON	57
INSTITUTE OF PUBLIC ADMINISTRATION		96 *
WASHINGTON	DC	96
IOWA STATE UNIV OF SCIENCE & TECH		308 *
AMES	IOWA	308
IOWA UNIVERSITY OF		1,941 *
AMES	IOWA	55
IOWA CITY	IOWA	1,886
ISSAQUAH HEALTH RESEARCH INSTITUTE		96 *
ISSAQUAH	WASHINGTON	96
JACKSON STATE UNIVERSITY		268 *
JACKSON	MISS	268
JOHN CARROLL UNIVERSITY		30 *
CLEVELAND	OHIO	30
JOHNS HOPKINS UNIVERSITY		226,703 *
BALTIMORE	MARYLAND	1,991
LAUREL	MARYLAND	224,712
KANSAS STATE UNIVERSITY		182 *
MANHATTAN	KANSAS	182
KANSAS UNIVERSITY OF		844 *
KANSAS CITY	KANSAS	80
LAWRENCE	KANSAS	683
KANSAS CITY	MISSOURI	81
KENTUCKY UNIVERSITY OF		383 *
LEXINGTON	KENTUCKY	383
KENTUCKY UNIVERSITY OF RESEARCH		136 *
LEXINGTON	KENTUCKY	136
LA JOLLA INSTITUTE		903 *
LA JOLLA	CALIFORNIA	903
LEHIGH UNIVERSITY		2,296 *
BETHLEHEM	PA	2,296
LOGISTICS MANAGEMENT INSTITUTE		194 *
WASHINGTON	DC	194
LONG ISLAND UNIVERSITY		30 *
GREENVALE	NEW YORK	30
LOUISIANA STATE UNIVERSITY OF		1,319 *
BATON ROUGE	LOUISIANA	937
NEW ORLEANS	LOUISIANA	382
LOUISVILLE UNIVERSITY OF		122 *
LOUISVILLE	KENTUCKY	122
LOWELL UNIVERSITY OF		556 *
LOWELL	MASS	556
LOYOLA UNIVERSITY		63 *
MAYWOOD	ILLINOIS	63
MAINE UNIVERSITY OF		77 *
ORONO	MAINE	77
MARYLAND UNIVERSITY OF		6,790 *
BALTIMORE	MARYLAND	1,075
COLLEGE PARK	MARYLAND	5,715
MASSACHUSETTS COLLEGE OF PHARMACY		26 *
BOSTON	MASS	26
MASSACHUSETTS GENERAL HOSPITAL		148 *
BOSTON	MASS	148
MASSACHUSETTS INSTITUTE TECHNOLOGY		247,845 *
CAMBRIDGE	MASS	90,107
LEXINGTON	MASS	157,738
MASSACHUSETTS UNIVERSITY OF		3,158 *
AMHERST	MASS	2,911
WORCESTER	MASS	247
MAYO FOUNDATION		511 *
ROCHESTER	MINNESOTA	511
MEDICAL COLLEGE OF GEORGIA		87 *
AUGUSTA	GEORGIA	87
MEDICAL COLLEGE OF OHIO		180 *
TOLEDO	OHIO	180
MEDICAL COLLEGE OF PENNSYLVANIA		70 *
PHILADELPHIA	PA	70
MEDICAL COLLEGE OF WISCONSIN		90 *
MILWAUKEE	WISCONSIN	90
MIAMI UNIVERSITY OF		3,353 *
CORAL GABLES	FLORIDA	976
MIAMI	FLORIDA	2,377
MICHAEL REESE RESEARCH FOUNDATION		291 *
CHICAGO	ILLINOIS	291
MICHIGAN STATE UNIVERSITY		1,531 *
ANN ARBOR	MICHIGAN	53
EAST LANSING	MICHIGAN	1,478
MICHIGAN TECHNOLOGICAL UNIVERSITY		1,102 *
HOUGHTON	MICHIGAN	1,102
MICHIGAN UNIVERSITY OF		3,064 *
ANN ARBOR	MICHIGAN	2,988
PONTIAC	MICHIGAN	76

Table 1. Educational and Other Nonprofit Institutions In the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1985 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
MIDWEST RESEARCH INSTITUTE		854 *
KANSAS CITY	MISSOURI	854
MILITARY OPERATIONS RESEARCH SOC		50 *
ALEXANDRIA	VIRGINIA	50
MINNESOTA UNIVERSITY OF		1,795 *
MINNEAPOLIS	MINNESOTA	392
ST PAUL	MINNESOTA	1,403
MISSISSIPPI STATE UNIVERSITY		739 *
COLUMBUS	MISS	110
MISSISSIPPI CI	MISS	45
STARKVILLE	MISS	82
STATE COLLEGE	MISS	502
MISSISSIPPI UNIVERSITY OF		620 *
JACKSON	MISS	249
UNIVERSITY	MISS	371
MISSOURI UNIVERSITY OF		1,306 *
COLUMBIA	MISSOURI	1,028
KANSAS CITY	MISSOURI	27
ROLLA	MISSOURI	251
MITRE CORP		204,242 *
BEDFORD	MASS	204,032
MCLEAN	VIRGINIA	158
PASO ROBLES	CALIFORNIA	52
MONELL CHEMICAL SENSES CENTER		61 *
PHILADELPHIA	PA	61
MONTANA STATE UNIVERSITY		73 *
BOZEMAN	MONTANA	73
MONTEFIORE HOSPITAL MEDICAL CENTER		26 *
NEW YORK	NEW YORK	26
MOREHOUSE COLLEGE		78 *
ATLANTA	GEORGIA	78
MOUNT SINAI HOSPITAL		35-*
NEW YORK	NEW YORK	35-
NATIONAL ACADEMY OF SCIENCES		9,900 *
WASHINGTON	DC	9,115
ABERDEEN PROV	MARYLAND	299
BETHESDA	MARYLAND	395
WHITE SANDS MB	NEW MEXICO	91
NATIONAL COUNCIL SOVIET EAST EUROP		810 *
WASHINGTON	DC	810
NATIONAL INSTITUTE PUBLIC POLICY		328 *
FAIRFAX	VIRGINIA	266
MCLEAN	VIRGINIA	62
NATIONAL JEWISH HOSPITAL		90 *
DENVER	COLORADO	90
NATIONAL OPINION RESEARCH CENTER		48 *
CHICAGO	ILLINOIS	48
NEBRASKA UNIVERSITY OF		499 *
LINCOLN	NEBRASKA	499
NEVADA UNIVERSITY OF		184 *
RENO	NEVADA	184
NEW HAMPSHIRE UNIVERSITY OF		551 *
DURHAM	NH	551
NEW JERSEY INSTITUTE OF TECHNOLOGY		264 *
NEWARK	NEW JERSEY	264
NEW JERSEY MEDICAL SCHOOL		41 *
NEWARK	NEW JERSEY	41
NEW MEXICO INSTITUTE MINING & TECH		2,138 *
SOCORRO	NEW MEXICO	2,138
NEW MEXICO STATE UNIVERSITY		14,013 *
LAS CRUCES	NEW MEXICO	1,728
WHITE SANDS MB	NEW MEXICO	12,285
NEW MEXICO UNIVERSITY OF		10,522 *
ALBUQUERQUE	NEW MEXICO	1,061
KIRTLAND AFB	NEW MEXICO	9,461
NEW ORLEANS UNIVERSITY OF		119 *
NEW ORLEANS	LOUISIANA	119
NEW YORK BLOOD CENTER INC		170 *
NEW YORK	NEW YORK	170
NEW YORK POLYTECHNIC INSTITUTE		1,458 *
BROOKLYN	NEW YORK	1,458
NEW YORK STATE UNIV RESEARCH FOUND		2,144 *
ALBANY	NEW YORK	1,870
BINGHAMTON	NEW YORK	120
BUFFALO	NEW YORK	154
NEW YORK STATE UNIVERSITY OF		1,119 *
ALBANY	NEW YORK	358
NEW YORK	NEW YORK	576
STONY BROOK	NEW YORK	185
NEW YORK UNIVERSITY		2,683 *
NEW YORK	NEW YORK	2,683
NEW YORK UNIVERSITY MEDICAL CENTER		120 *
NEW YORK	NEW YORK	120
NEW YORK ZOOLOGICAL SOCIETY		116 *
BROOKLYN	NEW YORK	116
NORTH CAROLINA AGRI & TECH STATE U		236 *
GREENSBORO	NCAR	236
NORTH CAROLINA STATE UNIVERSITY		1,731 *
RALEIGH	NCAR	1,731
NORTH CAROLINA UNIVERSITY OF		2,157 *
CHAPEL HILL	NCAR	2,067
WILMINGTON	NCAR	90
NORTH TEXAS STATE UNIVERSITY		631 *
DENTON	TEXAS	631
NORTHEASTERN RESEARCH FOUNDATION		117 *
BOOTHBAY HARBO	MAINE	117
NORTHEASTERN UNIVERSITY		2,362 *
BOSTON	MASS	2,362
NORTHERN ILLINOIS UNIVERSITY		143 *
DE KALB	ILLINOIS	143

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1963 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
NORTHWESTERN UNIVERSITY		1,686 *
EVANSTON	ILLINOIS	1,686
NOTRE DAME UNIVERSITY OF		258 *
NOTRE DAME	INDIANA	258
NOVA UNIVERSITY OF ADVANCED TECH		68 *
FORT LAUDERDAL	FLORIDA	68
OAKLAND UNIVERSITY		381 *
ROCHESTER	MICHIGAN	381
OBERLIN COLLEGE		46 *
OBERLIN	OHIO	46
OHIO STATE UNIV RESERCH FOUNDATION		4,522 *
COLUMBUS	OHIO	4,522
OHIO STATE UNIVERSITY THE		411 *
COLUMBUS	OHIO	411
OHIO WESLEYAN UNIVERSITY		169 *
DELAWARE	OHIO	169
OKLAHOMA STATE UNIVERSITY OF		2,476 *
EGLIN AFB	FLORIDA	1,511
STILLWATER	OKLAHOMA	965
OKLAHOMA UNIVERSITY OF		396 *
NORMAN	OKLAHOMA	217
OKLAHOMA CITY	OKLAHOMA	179
OLD DOMINION COLLEGE		180 *
NORFOLK	VIRGINIA	180
OLD DOMINION UNIVERSITY RSCH FOUND		452 *
NORFOLK	VIRGINIA	452
OREGON GRADUATE CTR FOR STUDY RES		165 *
BEAVERTON	OREGON	165
OREGON STATE OF		275 *
EUGENE	OREGON	162
PORTLAND	OREGON	113
OREGON STATE UNIVERSITY		3,924 *
CORVALLIS	OREGON	3,924
OREGON UNIVERSITY OF		643 *
EUGENE	OREGON	553
PORTLAND	OREGON	90
PACIFIC MEDICAL CENTER		87 *
SAN FRANCISCO	CALIFORNIA	87
PACIFIC NORTHWEST RSCH FOUNDATION		110 *
SEATTLE	WASHINGTON	110
PACIFIC UNIVERSITY OF THE		86 *
SAN FRANCISCO	CALIFORNIA	86
PALISADES GEOPHYSICAL INSTITUTE		445 *
WEST NYACK	NEW YORK	445
PALISADES INSTITUTE		74 *
NEW YORK	NEW YORK	74
PENNSYLVANIA HOSPITAL CONTRIBUTORS		142 *
PHILADELPHIA	PA	142
PENNSYLVANIA STATE UNIVERSITY		20,436 *
HERSHEY	PA	99
STATE COLLEGE	PA	2,707
UNIVERSITY PAR	PA	17,630
PENNSYLVANIA UNIVERSITY OF		3,947 *
PHILADELPHIA	PA	3,947
PETER BENT BRIGHAM HOSPITAL		180 *
BOSTON	MASS	180
PHILADELPHIA COLLEGE OF TEXTILES		184 *
PHILADELPHIA	PA	184
PIERCE JOHN B FOUNDATION OF CONN		164 *
NEW HAVEN	CONN	164
PITTSBURGH UNIVERSITY OF		2,431 *
PITTSBURGH	PA	2,431
POLYTECHNIC INSTITUTE OF NEW YORK		442 *
BROOKLYN	NEW YORK	442
PORTLAND STATE UNIVERSITY		169 *
PORTLAND	OREGON	169
PRINCETON UNIVERSITY		2,048 *
PRINCETON	NEW JERSEY	2,048
PUERTO RICO UNIVERSITY OF		256 *
RIO PIEDRAS	PUERTO RCO	118
SAN JUAN	PUERTO RCO	138
PURDUE RESEARCH FOUNDATION		2,279 *
LAFAYETTE	INDIANA	589
WEST LAFAYETTE	INDIANA	1,690
PURDUE UNIVERSITY		1,033 *
LAFAYETTE	INDIANA	50
WEST LAFAYETTE	INDIANA	983
RAND CORP		23,611 *
SANTA MONICA	CALIFORNIA	23,611
REGENTS OF THE UNIVERSITY OF MICH		801 *
ANN ARBOR	MICHIGAN	801
REGIS COLLEGE		475 *
WESTON	MASS	475
RENSSELAER POLYTECHNIC INSTITUTE		2,906 *
TROY	NEW YORK	2,906
RESEARCH FOUNDATION FOR MENTAL HYG		226 *
ALBANY	NEW YORK	226
RESEARCH INSTITUTE OF COLORADO		480 *
FORT COLLINS	COLORADO	480
RESEARCH TRIANGLE INSTITUTE		1,855 *
RESEARCH TRIAN	NCAR	1,855
RHODE ISLAND UNIVERSITY OF		2,588 *
KINGSTON	RI	2,588
RICE UNIVERSITY		814 *
HOUSTON	TEXAS	814
RIVERSIDE RESEARCH INSTITUTE		4,906 *
NEW YORK	NEW YORK	4,906

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1983 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ROCHESTER INSTITUTE OF TECHNOLOGY		80 *
ROCHESTER	NEW YORK	80
ROCHESTER UNIVERSITY OF		20,393 *
ARLINGTON	VIRGINIA	15,588
ROCHESTER	NEW YORK	4,805
ROCKEFELLER UNIVERSITY		153 *
NEW YORK	NEW YORK	153
RUTGERS UNIVERSITY		1,089 *
NEW BRUNSWICK	NEW JERSEY	1,049
PISCATAWAY	NEW JERSEY	40
S R I INTERNATIONAL		43,685 *
ARLINGTON	VIRGINIA	75
MENLO PARK	CALIFORNIA	43,610
SAINT JOSEPH COLLEGE MARYLAND		87 *
PHILADELPHIA	PA	87
SAINT LOUIS UNIVERSITY		270 *
ST LOUIS	MISSOURI	270
SALK INSTITUTE THE		5,451 *
SWIFTWATER	PA	5,451
SAN DIEGO STATE UNIV FOUNDATION		49-*
SAN DIEGO	CALIFORNIA	49-
SAN DIEGO UNIVERSITY FOUNDATION		126 *
SAN DIEGO	CALIFORNIA	126
SAN FRANCISCO MEDICAL RSCH INST		74 *
SAN FRANCISCO	CALIFORNIA	74
SAN JOSE STATE UNIVERSITY FOUND		319 *
LONG BEACH	CALIFORNIA	163
SAN JOSE	CALIFORNIA	156
SCRIPPS CLINIC RESEARCH		440 *
LA JOLLA	CALIFORNIA	440
SIDNEY FARBER CANCER INSTITUTE		32 *
BOSTON	MASS	32
SOCIETY OF AUTOMOTIVE ENGINEERS		45 *
WARRENDALE	PA	45
SOUTH CAROLINA UNIVERSITY OF		61 *
COLUMBIA	SCAR	61
SOUTH DAKOTA SCHOOL OF MINES TECH		140 *
RAPID CITY	SDAK	140
SOUTH FLORIDA UNIVERSITY OF		409 *
ST PETERSBURG	FLORIDA	50
TAMPA	FLORIDA	359
SOUTHEASTERN CTR ELECT ENGR EDUC		2,697 *
HANSCOM AFB	MASS	90
ORLANDO	FLORIDA	79
ST CLOUD	FLORIDA	2,357
WRIGHT PATTERS	OHIO	171
SOUTHERN CALIFORNIA UNIVERSITY OF		16,762 *
LOS ANGELES	CALIFORNIA	16,723
MARINA DEL REY	CALIFORNIA	39
SOUTHERN ILLINOIS UNIVERSITY		74 *
CARBONDALE	ILLINOIS	74
SOUTHERN METHODIST UNIVERSITY OF		415 *
DALLAS	TEXAS	415
SOUTHERN RESEARCH INSTITUTE		3,914 *
BIRMINGHAM	ALABAMA	3,914
SOUTHWEST RESEARCH INSTITUTE		11,368 *
SAN ANTONIO	TEXAS	11,368
STANFORD UNIVERSITY		25,993 *
MENLO PARK	CALIFORNIA	44
STANFORD	CALIFORNIA	25,949
STEVENS INSTITUTE OF TECHNOLOGY		1,266 *
HOBOKEN	NEW JERSEY	1,266
SYRACUSE RESEARCH CORP		2,635 *
SYRACUSE	NEW YORK	2,635
SYRACUSE UNIVERSITY		687 *
SYRACUSE	NEW YORK	687
SYRACUSE UNIVERSITY RESEARCH CORP		490 *
SYRACUSE	NEW YORK	490
TEMPLE UNIVERSITY		122 *
PHILADELPHIA	PA	122
TENNESSEE TECHNOLOGICAL UNIVERSITY		55 *
COOKEVILLE	TENNESSEE	55
TENNESSEE UNIVERSITY OF		1,326 *
KNOXVILLE	TENNESSEE	780
MEMPHIS	TENNESSEE	276
TULLAHOMA	TENNESSEE	270
TEXAS A & M RESEARCH FOUNDATION		3,121 *
COLLEGE STATIO	TEXAS	3,121
TEXAS A & M UNIVERSITY		483 *
COLLEGE STATIO	TEXAS	483
TEXAS CHRISTIAN UNIVERSITY		188 *
FORT WORTH	TEXAS	188
TEXAS TECHNOLOGICAL COLLEGE		1,136 *
LUBBOCK	TEXAS	1,136
TEXAS UNIVERSITY OF		23,250 *
	ANTARCTICA	826
ARLINGTON	TEXAS	63
AUSTIN	TEXAS	21,446
BROOKS AFB	TEXAS	55
DALLAS	TEXAS	184
EL PASO	TEXAS	144
GALVESTON	TEXAS	182
HOUSTON	TEXAS	132
RICHARDSON	TEXAS	389
SAN ANTONIO	TEXAS	867
TEXAS WESLEYAN COLLEGE		89 *
FORT WORTH	TEXAS	89
TEXTILE RESEARCH INSTITUTE		104 *
PRINCETON	NEW JERSEY	104
TRUDEAU INSTITUTE INC		98 *
SARANAC LAKE	NEW YORK	98
TUFTS UNIVERSITY		291 *
MEDFORD	MASS	291

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1983 (Concluded)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
TULANE UNIVERSITY OF LOUISIANA		279 *
COVINGTON	LOUISIANA	56
NEW ORLEANS	LOUISIANA	223
TULSA UNIVERSITY OF		132 *
TULSA	OKLAHOMA	132
TUSKEGEE INSTITUTE		137 *
TUSKEGEE	ALABAMA	137
UNDERSEA MEDICAL SOCIETY INC		59 *
BETHESDA	MARYLAND	59
UTAH STATE UNIVERSITY		8,745 *
LOGAN	UTAH	8,745
UTAH UNIVERSITY OF		4,304 *
SALT LAKE CITY	UTAH	4,304
VANDERBILT UNIVERSITY		861 *
NASHVILLE	TENNESSEE	861
VERMONT UNIVERSITY OF		279 *
BURLINGTON	VERMONT	279
VILLANOVA UNIVERSITY		40 *
VILLANOVA	PA	40
VIRGINIA COMMONWEALTH UNIVERSITY		550 *
RICHMOND	VIRGINIA	550
VIRGINIA INST OF MARINE SCIENCES		90 *
GLOUCESTER POI	VIRGINIA	90
VIRGINIA MASON RESEARCH CENTER		121 *
SEATTLE	WASHINGTON	121
VIRGINIA MILITARY INSTITUTE		217 *
LEXINGTON	VIRGINIA	217
VIRGINIA POLYTECHNIC INSTITUTE		3,286 *
BLACKSBURG	VIRGINIA	3,286
VIRGINIA UNIVERSITY OF		1,670 *
CHARLOTTESVILL	VIRGINIA	1,670
WASHINGTON BOOKER T FOUNDATION		2,033 *
WASHINGTON	DC	2,033
WASHINGTON SCHOOL OF PSYCHIATRY		27 *
WASHINGTON	DC	27
WASHINGTON STATE UNIVERSITY		1,086 *
PULLMAN	WASHINGTON	1,086
WASHINGTON UNIVERSITY		933 *
RICHLAND	WASHINGTON	30
ST LOUIS	MISSOURI	903
WASHINGTON UNIVERSITY OF		19,269 *
SEATTLE	WASHINGTON	19,269
WAYNE STATE UNIVERSITY		794 *
DETROIT	MICHIGAN	794
WENTWORTH INSTITUTE		1,171 *
BOSTON	MASS	1,171
WEST VIRGINIA UNIVERSITY		65 *
MORGANTOWN	WVA	65
WESTERN MICHIGAN UNIVERSITY		25 *
KALAMAZOO	MICHIGAN	25
WILLIAMS COLLEGE		65 *
WILLIAMSTOWN	MASS	65
WISCONSIN UNIVERSITY OF		4,285 *
MADISON	WISCONSIN	4,247
PLATTEVILLE	WISCONSIN	38
WOODS HOLE OCEANOGRAPHIC INST		9,640 *
WOODS HOLE	MASS	9,640
WORCESTER POLYTECHNIC INSTITUTE		189 *
WORCESTER	MASS	189
WRIGHT STATE UNIVERSITY		695 *
DAYTON	OHIO	193
WRIGHT PATTERS	OHIO	502
WYOMING UNIVERSITY OF		314 *
LARAMIE	WYOMING	314
YALE UNIVERSITY		4,462 *
NEW HAVEN	CONN	4,462
YESHIVA UNIVERSITY		25 *
BRONX	NEW YORK	25
YOUNGSTOWN STATE UNIVERSITY		26 *
YOUNGSTOWN	OHIO	26
		1,727,194

Table 2. U.S. Government Agencies Receiving DOD Prime Contract Awards Over $25,000 for RDT&E Work: FY 1983

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
NATIONAL SCIENCE FOUNDATION	742 *		
WASHINGTON DC	742		
SMITHSONIAN INSTITUTION	547 *		
WASHINGTON DC	262		
CAMBRIDGE MASS	285		
UNITED STATES AGRICULTURE DEPT	125 *		
GAINESVILLE FLORIDA	125		
UNITED STATES COMMERCE DEPT	3,397 *		
WASHINGTON DC	1,630		
BOULDER COLORADO	1,392		
GAITHERSBURG MARYLAND	33		
MIAMI FLORIDA	35		
ROCKVILLE MARYLAND	82		
SEATTLE WASHINGTON	223		
UNITED STATES ENERGY DEPT	1,263 *		
ARGONNE ILLINOIS	173		
OAK RIDGE TENNESSEE	310		
LIVERMORE CALIFORNIA	127		
OAKLAND CALIFORNIA	653		
UNITED STATES GENERAL SERVICES ADM	75 *		
WASHINGTON DC	75		
UNITED STATES HEALTH HUMAN SVCS	316 *		
ATLANTA GEORGIA	316		
UNITED STATES LABOR DEPT	100 *		
WASHINGTON DC	100		
UNITED STATES NATL AERO SPACE AGY	19,261 *		
RIDGELEY WVA	19,069		
PASADENA CALIFORNIA	192		
UNITED STATES PATENT OFFICE	63 *		
WASHINGTON DC	63		
	25,829		

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $25,000 for RDT&E Work: FY 1983

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ALBERTA UNIVERSITY		49 *
	CANADA	49
BEN GURION UNIVERSITY OF THE NEGEV		34 *
	ISRAEL	34
BRISTOL UNIVERSITY OF		30 *
	UN KINGDOM	30
BRUNEL UNIVERSITY		25 *
	UN KINGDOM	25
CAMBRIDGE UNIVERSITY OF		47 *
	UN KINGDOM	47
CANADIAN COMMERCIAL CORP		6,780 *
	CANADA	6,716
WARMINSTER	PA	64
CENTRO DI CULTURA SCIENTIFICA		33 *
	ITALY	33
DALHOUSIE UNIVERSITY		245 *
	CANADA	245
DEFENSE RESEARCH ESTABLISHMENT PAC		40 *
	UN KINGDOM	40
ECOLE POLYTECHQUE FEDERALE		31 *
	SWITZERLND	31
HANNOVER UNIVERSITAET		90 *
	GERMANY	90
HEBREW UNIVERSITY		118 *
	ISRAEL	118
IMPERIAL COLLEGE OF SCIENCE & TECH		130 *
	UN KINGDOM	130
INSTITUTE OF MARINE RESEARCH		32 *
	FINLAND	32
INSTITUTE OF OCEAN SCIENCES		40 *
	CANADA	40
INVERESK RESEARCH INTERNATIONAL		153 *
	UN KINGDOM	153
ISRAEL INSTITUTE FOR BIOL RSCH		30 *
	ISRAEL	30
ISRAEL MILITARY INDUSTRIES		86 *
	ISRAEL	86
KEELE UNIVERSITY OF		28 *
	UN KINGDOM	28
LIVERPOOL UNIVERSITY OF		74 *
	UN KINGDOM	74
LONDON UNIVERSITY OF		47 *
	UN KINGDOM	47
MANCHESTER UNIVERSITY		30 *
	UN KINGDOM	30
MCGILL UNIVERSITY		59 *
	CANADA	59
NATIONAL RESEARCH COUNCIL		90 *
	CANADA	90
NORTH WALES UNIVERSITY COLLEGE OF		131 *
	UN KINGDOM	131
OXFORD UNIVERSITY		26 *
	UN KINGDOM	26
QUEEN MARY COLLEGE		27 *
	UN KINGDOM	27
ROYAL NORWEGIAN NAV MAT COMM		314 *
	NORWAY	314
SALFORD UNIVERSITY OF		27 *
	UN KINGDOM	27
STUTTGART UNIVERSITY OF		52 *
	GERMANY	52
TAVISTOCK INSTITUTE OF HUMAN REL		620 *
	UN KINGDOM	620
TECHNION RESEARCH & DEV FOUNDATION		65 *
	ISRAEL	65
TORONTO UNIVERSITY OF		184 *
	CANADA	184
UNITED KINGDOM MINISTRY OF DEFENCE		10-*
	BELGIUM	49
	UN KINGDOM	59-
UNIVERSITA DI MODENA		26 *
	ITALY	26
UNIVERSITY COLLEGE		31 *
	UN KINGDOM	31
UNIVERSITY COLLEGE LONDON		40 *
	UN KINGDOM	40
VRIJE UNIVERSITEIT BRUSSEL		33 *
	BELGIUM	33
WEIZMANN INSTITUTE OF SCIENCE		138 *
	ISRAEL	138
WESTERN ONTARIO UNIVERSITY OF THE		217 *
	CANADA	217
		12,190

Note: An "–" indicates a minus amount (cancellations exceeded new awards).

EDUCATIONAL AND NONPROFIT INSTITUTIONS RECEIVING PRIME CONTRACT AWARDS FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Fiscal Year 1984

FOREWORD

Educational and Nonprofit Institutions Receiving Prime Contract Awards for Research, Development, Test, and Evaluation is published annually.

—This [illegible] report provides information on Department of Defense prime contract awards to educational and nonprofit institutions. These data are shown in three sections, organized by awards to:

1. Educational and nonprofit institutions within the United States;
2. U.S. government agencies; and
3. Foreign institutions and government agencies.

INTRODUCTION

This report presents data on Department of Defense (DOD) prime contract awards over $25,000 for research, development, test, and evaluation (RDT&E) made to educational and nonprofit institutions during Fiscal Year (FY) 1984. The data are presented in three tables, each of which lists contractors alphabetically and gives the net value of all awards to the contractor as well as the value of the awards to each of the contractor's locations, where applicable. Table 1 covers awards to educational and other nonprofit institutions in the United States. Table 2 covers awards to U.S. government agencies, and data on awards to foreign institutions and government agencies are provided in Table 3.

NOTES ON COVERAGE

The dollar amounts shown here include prime contract awards over $25,000 for RDT&E work only. Data on awards for other services, such as training, and on any supplies furnished by the contractor in support of research being done are excluded. Contract awards for civil functions are included in these data. Civil functions encompass planning, programming, designing, constructing, and operating Federal water resource projects for navigation, flood control, hydroelectric power production, water supply, and other related activities.

The locations shown in the tables are the sites where the work was to be performed. Normally, this is a facility of the institution awarded the contract. However, if the work was scheduled to be performed at a Defense facility, such as an Air Force base, the location shown is that of the Defense facility rather than the institution.

HIGHLIGHTS

The following table shows the number of institutions receiving contracts and the net value of the awards, by type of institution, for FY 1984 and FY 1983.

TYPE OF INSTITUTION	FISCAL YEAR			
	1984		1983	
	NUMBER	AMOUNT*	NUMBER	AMOUNT*
TOTAL	403	$2,168	367	$1,761
U.S. INSTITUTIONS - TOTAL	318	2,117	317	1,727
Educational	240	1,069	204	942
Other Nonprofit	78	1,048	113	785
U.S. GOVERNMENT AGENCIES	9	21	10	22
FOREIGN INSTITUTIONS AND GOVERNMENT AGENCIES	76	30	40	12

**Amounts in millions.*

In FY 1984, educational and nonprofit institutions received DOD prime contract awards over $25,000 for RDT&E totaling $2,168 million compared to $1,761 in FY 1983. This represents an increase of $407 million or 23.1 percent. Awards for foreign institutions had the largest percentage increase of all institutions, increasing from $12 million in FY 1983 to $30 million in FY 1984, an increase of 150.0 percent. Awards to U.S. institutions had the second largest percentage gain, growing from $1,727 million in FY 1983 to $2,117 million in FY 1984, an increase of 22.6 percent. Awards to U.S. government agencies decreased from $22 million in FY 1983 to $21 million in FY 1984, a decrease of 4.5 percent.

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ACADEMY OF APPLIED SCIENCE INC		286 *
RALEIGH	N CAROLINA	286
ADVANCED INT'L STUDIES		300 *
WASHINGTON	DIST COL	100
BETHESDA	MARYLAND	200
AEROSPACE CORPORATION THE		273,409 *
EL SEGUNDO	CALIFORNIA	271,900
ORANGE	CALIFORNIA	1,509
ABOURON INSTITUTE		1,036 *
PLACENTIA	CALIFORNIA	1,036
ALABAMA A & M UNIVERSITY		50 *
NORMAL	ALABAMA	50
ALBANY MEDICAL CENTER HOSPITAL		356 *
ALBANY	NEW YORK	356
AMER ASSOC TISSUE BANK		76 *
ARLINGTON	VIRGINIA	76
AMERICAN COLLEGE TSTG		119 *
IOWA CITY	IOWA	119
AMERICAN DENTAL ASSOCIATION		35 *
CHICAGO	ILLINOIS	35
AMERICAN INST BIO SC		40 *
ARLINGTON	VIRGINIA	40
AMERICAN RED CROSS		50 *
WASHINGTON	DIST COL	50
AMERICAN SOC FO ENGRG EDUCTN		1,190 *
WASHINGTON	DIST COL	1,190
AMERICAN UNIVERSITY		1,192 *
WASHINGTON	DIST COL	1,192
ANALYTIC SERVICES INC		19,133 *
ARLINGTON	VIRGINIA	19,133
ARIZONA BOARD OF REGENTS		246 *
TUCSON	ARIZONA	246
ARIZONA STATE UNIV		1,083 *
TEMPE	ARIZONA	1,038
TUCSON	ARIZONA	45
ARKANSAS UNIVERSITY OF		49 *
FAYETTEVILLE	ARKANSAS	49
ARMOUR PHARMACEUTICAL COMPANY		1,711 *
CHICAGO	ILLINOIS	1,711
ASSOC MED BSD ED ENG INC		60 *
ATLANTA	GEORGIA	60
ATHENS STATE COLLEGE		80 *
ATHENS	ALABAMA	80
ATLANTA UNIVERSITY		500 *
ATLANTA	GEORGIA	500
AUBURN UNIVERSITY		1,119 *
AUBURN	ALABAMA	1,119
BALL STATE UNIVERSITY		92 *
MUNCIE	INDIANA	92
BANCOMM CORPORATION		836 *
WHITE SANDS MI	NEW MEXICO	836
BATTELLE MEMORIAL INSTITUTE		22,388 *
HUNTSVILLE	ALABAMA	220
REDSTONE ARSEN	ALABAMA	64
LOS ANGELES	CALIFORNIA	29
MENLO PARK	CALIFORNIA	99
ORANGE	CALIFORNIA	27
PLACENTIA	CALIFORNIA	69
SAN DIEGO	CALIFORNIA	109
SAN RAFAEL	CALIFORNIA	92
BOULDER	COLORADO	39
ORLANDO	FLORIDA	74
ATLANTA	GEORGIA	109
FORT GORDON	GEORGIA	29
CHAMPAIGN	ILLINOIS	39
CHICAGO	ILLINOIS	99
WEST LAFAYETTE	INDIANA	27
MANHATTAN	KANSAS	393
ABERDEEN PROVI	MARYLAND	848
BURLINGTON	MASS	37
CAMBRIDGE	MASS	69
NATICK	MASS	192
WILMINGTON	MASS	42
WOBURN	MASS	49
ANN ARBOR	MICHIGAN	39
ST. PAUL	MINNESOTA	76
DURHAM	N CAROLINA	77
RESEARCH TRIAN	N CAROLINA	849
DOVER	NEW JERSEY	902
CROTON-ON-HUDS	NEW YORK	40
CLEVELAND	OHIO	39
COLUMBUS	OHIO	16,399
CORVALLIS	OREGON	61
KING OF PRUSSI	PENN	69
PHILADELPHIA	PENN	39
WARMINSTER	PENN	68
CHARLESTON	S CAROLINA	32
DENTON	TEXAS	57
SAN ANTONIO	TEXAS	821
DUGWAY	UTAH	79
ALEXANDRIA	VIRGINIA	399
ARLINGTON	VIRGINIA	99
BAILEYS CROSSR	VIRGINIA	73
FAIRFAX	VIRGINIA	64
FORT BELVOIR	VIRGINIA	27
HAMPTON	VIRGINIA	49
MCLEAN	VIRGINIA	186
RICHLAND	WASHINGTON	211
SEATTLE	WASHINGTON	70
BATTELLE-COLUMBUS LABORATORS		1,971 *
COLUMBUS	OHIO	1,971
BAYLOR COLLEGE OF MEDICINE		321 *
HOUSTON	TEXAS	321
BIGELOW LAB FOR OCEAN SCIENCES		167 *
BOOTHBAY HARBO	MAINE	167

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
BOSTON COLLEGE TRUSTEES OF		2,112 •
BOSTON	MASS	202
CAMBRIDGE	MASS	53-
HANSCOM AIR FO	MASS	339
NEWTON	MASS	1,626
BOSTON UNIVERSITY TRUSTEES		3,866 •
BOSTON	MASS	3,796
HANSON	MASS	70
BRANDEIS UNIVERSITY		66 •
WALTHAM	MASS	66
BRIGHAM AND WOMENS HOSPITAL		178 •
BOSTON	MASS	178
BRIGHAM YOUNG UNIVERSITY		627 •
PROVO	UTAH	627
BROOKLYN COLLEGE		53 •
NEW YORK	NEW YORK	53
BROWN UNIV PRV ST RI PLAN		2,352 •
HANOVER	PENN	106
PROVIDENCE	RHODE ISL	2,246
CALIFORNIA INST		5,709 •
PASADENA	CALIFORNIA	5,709
CALIFORNIA STATE OF		63 •
HAYWARD	CALIFORNIA	63
CALIFORNIA STATE UNIV		123 •
LONG BEACH	CALIFORNIA	123
CALIFORNIA URS IN HLTH CNCL		168 •
BERKELEY	CALIFORNIA	168
CARNEGIE INSTITUTE		200 •
PITTSBURGH	PENN	200
CARNEGIE INSTITUTION OF WASH		100 •
WASHINGTON	DIST COL	100
CARNEGIE MELLON UNIVERSITY		9,701 •
PITTSBURGH	PENN	9,701
CASE & COMPANY INC		115 •
CHICAGO	ILLINOIS	115
CASE WSTRN RSRV UNVRSTY		2,966 •
CLEVELAND	OHIO	2,803
PITTSBURGH	PENN	163
CATHOLIC UNIVERSITY OF AMER		649 •
WASHINGTON	DIST COL	649
CENTER FOR BLOOD RESEARCH INC		68 •
BOSTON	MASS	68
CENTRAL TX UNION JR CLLG		154 •
	GERMANY W	154
CHILDRENS HOSP OF PHILA		109 •
PHILADELPHIA	PENN	109
CITY OF HOPE		89 •
DUARTE	CALIFORNIA	89
CLARKSON UNIVERSITY		820 •
POTSDAM	NEW YORK	820
CLEMSON UNIVERSITY		287 •
CLEMSON	S CAROLINA	187
CLEMSON UNIVER	S CAROLINA	100
COLORADO SCHOOL OF MINES		1,083 •
GOLDEN	COLORADO	933
IDAHO SPRINGS	COLORADO	147
COLORADO SEMINARY		1,117 •
DENVER	COLORADO	1,117
COLORADO STATE UNIVERSITY		1,749 •
FORT COLLINS	COLORADO	1,749
COLUMBIA UNIVERSITY		121 •
NEW YORK	NEW YORK	121
COLUMBIA UNIVERSITY		9,447 •
WASHINGTON	DIST COL	410
NEW YORK	NEW YORK	8,564
PALISADES	NEW YORK	473
COMMONWEALTH OF VIRGINIA		180 •
GLOUCESTER POI	VIRGINIA	131
RICHMOND	VIRGINIA	49
CONSORTIUM OF UNIVERSITIES		278 •
WASHINGTON	DIST COL	278
COORDINATING RESEARCH COUNCIL		110 •
ATLANTA	GEORGIA	110
CORNELL UNIVERSITY		5,900 •
ITHACA	NEW YORK	5,428
NEW YORK	NEW YORK	472
DANA FARBER CANCER INST INC		98 •
BOSTON	MASS	98
DARTMOUTH COLLEGE		606 •
HANOVER	NEW HAMPSH	606
DENVER RESEARCH INSTITUTE		90 •
DENVER	COLORADO	90
DRAPER CHARLES STARK LAB		287,178 •
CAMBRIDGE	MASS	287,178
DREXEL UNIVERSITY		1,031 •
PHILADELPHIA	PENN	1,031
DUKE UNIVERSITY		1,987 •
BEAUFORT	N CAROLINA	96
DURHAM	N CAROLINA	1,891
EAST CAROLINA UNIVERSITY		68 •
GREENVILLE	N CAROLINA	68
EASTERN VIRGINIA MED AUTH		208 •
NORFOLK	VIRGINIA	208

- MINUS AMOUNT (CANCELLATIONS EXCEED NEW AWARDS)

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
EDUCATIONAL TESTING SERVICE		320 *
PRINCETON	NEW JERSEY	320
EMMANUEL COLLEGE		1,730 *
BOSTON	MASS	549
HANSCOM AIR FB	MASS	371
LEXINGTON	MASS	810
EMORY UNIVERSITY INC		110 *
ATLANTA	GEORGIA	110
ENVIRNMNTL RSRCH GRP INC		90 *
ANN ARBOR	MICHIGAN	90
ENVIRONMENTAL RES INST MICH		8,508 *
ANN ARBOR	MICHIGAN	8,508
FAIRLEIGH DICKINSON UNIVERSITY		64 *
HACKENSACK	NEW JERSEY	64
FALCON RESEARCH & DEV CO		25 *
ENGLEWOOD	COLORADO	25
FLIGHT SAFETY FOUNDATION INC		87 *
ARLINGTON	VIRGINIA	87
FLORIDA ATLANTIC UNIVERSITY		93 *
BOCA RATON	FLORIDA	93
FLORIDA STATE OF		805 *
ORLANDO	FLORIDA	805
FLORIDA STATE UNIVERSITY		1,729 *
TALLAHASSEE	FLORIDA	1,729
FOUNDATION FOR SOVIET STUDIE		99 *
SILVER SPRING	MARYLAND	99
FRANKLIN INSTITUTE THE		813 *
PHILADELPHIA	PENN	813
GAMBLE ELIZABETH DCNSS HM ASSN		108 *
CINCINNATI	OHIO	108
GEORGE MASON UNIVERSITY		88 *
FAIRFAX	VIRGINIA	88
GEORGE WASHINGTON UNVRSTY THE		2,703 *
WASHINGTON	DIST COL	2,703
GEORGETOWN UNIVERSITY		1,946 *
WASHINGTON	DIST COL	1,946
GEORGIA INSTITUTE TECHNOLOGY		1,824 *
ATLANTA	GEORGIA	1,824
GEORGIA STATE UNIVERSITY		48 *
ATLANTA	GEORGIA	48
GEORGIA TECH RESEARCH CORP		26,378 *
ATLANTA	GEORGIA	26,313
HOLLOMAN AIR F	NEW MEXICO	65
GORGAS MEMORIAL INSTITUTE		219 *
WASHINGTON	DIST COL	219
HAHNEMANN MEDICAL COLLEGE		110 *
PHILADELPHIA	PENN	110
HAMPTON INSTITUTE		96 *
HAMPTON	VIRGINIA	96
HARVARD UNIVERSITY		3,067 *
CAMBRIDGE	MASS	3,067
HASKINS LABORATORIES INC		126 *
NEW HAVEN	CONN	126
HOWARD UNIVERSITY		993 *
WASHINGTON	DIST COL	993
HUDSON INSTITUTE INC		22,839 *
CROTON-ON-HUDS	NEW YORK	22,715
HUDSON	NEW YORK	124
HUMAN RESOURCES RES ORGANIZTN		4,804 *
ALEXANDRIA	VIRGINIA	4,804
HUNTER COLLEGE OF NEW YORK		60 *
NEW YORK	NEW YORK	60
HUTCHINSON		199 *
SEATTLE	WASHINGTON	199
I I T RESEARCH INSTITUTE		42,479 *
CHICAGO	ILLINOIS	38,615
ANNAPOLIS	MARYLAND	3,787
LANHAM	MARYLAND	81
ROME	NEW YORK	43
ILLINOIS INSTITUTE TECHNOLOGY		620 *
CHICAGO	ILLINOIS	620
INDIANA UNIVERSITY		66 *
BLOOMINGTON	INDIANA	66
INDIANA UNIVERSITY FOUNDATION		388 *
BLOOMINGTON	INDIANA	336
INDIANAPOLIS	INDIANA	52
INST FOR EXPERMNTAL PSY		79 *
PHILADELPHIA	PENN	79
INSTITUTE APLD PHSLGY MED		45-*
SEATTLE	WASHINGTON	45-
INSTITUTE FOR ADVANCED STUDY		75 *
PRINCETON	NEW JERSEY	75
INSTITUTE FOR DEF ANALYSIS		23,629 *
ALEXANDRIA	VIRGINIA	23,629
INSTITUTE FOR MED RES		46 *
SAN JOSE	CALIFORNIA	46
INSTITUTE FR FRON PLCY ANLS		566 *
CAMBRIDGE	MASS	566
IOWA STATE UNIVERSITY		146 *
AMES	IOWA	146

- = MINUS AMOUNT (CANCELLATIONS EXCEED NEW AWARDS)

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ISSAQUAH HEALTH RESEARCH INST		31 *
ISSAQUAH	WASHINGTON	31
JACKSON STATE UNIVERSITY		157 *
JACKSON	MISS	157
JEFFERSON THE COUNTY OF		72 *
PERRY	KANSAS	72
JERSEY CITY STATE COLLEGE		139 *
JERSEY CITY	NEW JERSEY	139
JOHNS HOPKINS UNIVERSITY		272,814 *
BALTIMORE	MARYLAND	2,798
LAUREL	MARYLAND	270,016
KANSAS STATE UNIVERSITY		285 *
MANHATTAN	KANSAS	285
KENT STATE UNIVERSITY		75 *
KENT	OHIO	75
LA JOLLA INSTITUTE		1,434 *
PLACENTIA	CALIFORNIA	242
SAN DIEGO	CALIFORNIA	1,075
ROCKVILLE	MARYLAND	117
LEHIGH UNIVERSITY		1,916 *
BETHLEHEM	PENN	1,458
SAYBROOK	PENN	458
LOMA LINDA UNIVERSITY		209 *
LOMA LINDA	CALIFORNIA	209
LOUISIANA ST UNV AGR MH CL SY		1,228 *
BATON ROUGE	LOUISIANA	1,191
NEW ORLEANS	LOUISIANA	37
LOUISIANA STATE OF		35 *
NEW ORLEANS	LOUISIANA	35
LOWELL OBSERVATORY		69 *
FLAGSTAFF	ARIZONA	69
LOYOLA UNIVERSITY OF CHICAGO		82 *
MAYWOOD	ILLINOIS	82
LSU MEDICAL CENTER		259 *
NEW ORLEANS	LOUISIANA	259
MARYLAND STATE OF		634 *
BALTIMORE	MARYLAND	548
COLLEGE PARK	MARYLAND	86
MASSACHUSETTS INSTITUTE TECH		260,882 *
CAMBRIDGE	MASS	31,014
LEXINGTON	MASS	229,838
LOWELL	MASS	30
MASSACHUSETTS UNIVERSITY OF		3,675 *
AMHERST	MASS	3,186
WORCESTER	MASS	489
MAYO FOUNDATION		871 *
ROCHESTER	MINNESOTA	871
MEDICAL CLG OHIO TOLEDO		109 *
TOLEDO	OHIO	109
MEDICAL COLLEGE OF GEORGIA		222 *
AUGUSTA	GEORGIA	222
MEDICAL COLLEGE OF PENNA		180 *
PHILADELPHIA	PENN	180
MEDICAL COLLG WIS THE		100 *
MILWAUKEE	WISCONSIN	100
MEDICAL RESEARCH INSTITUTE		182 *
SAN FRANCISCO	CALIFORNIA	182
MICHIGAN STATE UNIVERSITY		1,838 *
EAST LANSING	MICHIGAN	1,783
LANSING	MICHIGAN	55
MICHIGAN TECHNOLOGICAL UNIV		1,253 *
HORTON BAY	MICHIGAN	84
HOUGHTON	MICHIGAN	1,169
MIDWEST RESEARCH INSTITUTE		816 *
KANSAS CITY	MISSOURI	816
MILITARY OPERATIONS RES SOC		100 *
ALEXANDRIA	VIRGINIA	100
MISSISSIPPI STATE UNIVERSITY		777 *
CLINTON	MISS	288
MISSISSIPPI ST	MISS	175
STATE COLLEGE	MISS	314
MITRE CORPORATION THE		238,367 *
BEDFORD	MASS	237,845
MCLEAN	VIRGINIA	522
MONELL CHEM SENSES CTR INC		58 *
PHILADELPHIA	PENN	58
MONTANA STATE UNIVERSITY		109 *
BOZEMAN	MONTANA	109
N Y UNIV COURANT INST		146 *
NEW YORK	NEW YORK	146
NATIONAL ACADEMY OF SCIENCES		7,789 *
WASHINGTON	DIST COL	7,659
WARMINSTER	PENN	130
NATIONAL COUNCIL ON SOVIET&EAS		278 *
WASHINGTON	DIST COL	278
NATIONAL INSTITUTE FOR PUBLIC		838 *
FAIRFAX	VIRGINIA	838
NATIONAL OPIN RES CTR INC CO		184 *
CHICAGO	ILLINOIS	184
NATL COUNCIL RADIATION & PROTE		29 *
WASHINGTON	DIST COL	29
NEW HAMPSHIRE UNIVERSITY SYS		127 *
DURHAM	NEW HAMPSH	127

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
NEW JERSEY INST TECH		127 *
NEWARK	NEW JERSEY	127
NEW MEXICO INST MINING & TECH		2,616 *
SOCORRO	NEW MEXICO	2,616
NEW MEXICO STATE UNIVERSITY		12,339 *
LAS CRUCES	NEW MEXICO	6,880
WHITE SANDS MI	NEW MEXICO	5,459
NEW YORK BLOOD CENTER INC		268 *
NEW YORK	NEW YORK	268
NEW YORK INST OF TECH		371 *
OLD WESTBURY	NEW YORK	371
NEW YORK MEDICAL COLLEGE		26-*
VALHALLA	NEW YORK	26-
NEW YORK UNIVERSITY		1,999 *
ITHACA	NEW YORK	100
NEW YORK	NEW YORK	1,899
NEW YORK ZLGCL SCTY		44 *
BROOKLYN	NEW YORK	44
NORFOLK STATE UNIVERSITY		66 *
NORFOLK	VIRGINIA	66
NORTH CAROLINA AGRI & TECH		124 *
GREENSBORO	N CAROLINA	124
NORTH CAROLINA STATE UNIV		2,700 *
RALEIGH	N CAROLINA	2,700
NORTH TEXAS STATE UNIVERSITY		452 *
DENTON	TEXAS	252
DENTON	TEXAS	200
NORTHEASTERN RESEARCH FDN		98 *
BOOTHBAY HARBO	MAINE	98
NORTHEASTERN UNVSTY CORP		2,200 *
BOSTON	MASS	2,200
NORTHWESTERN UNIVERSITY		1,847 *
EVANSTON	ILLINOIS	1,847
NOVA UNIVERSITY INC		71 *
FORT LAUDERDAL	FLORIDA	71
OAKLAND UNIVERSITY		404 *
ROCHESTER	MICHIGAN	404
OHIO STATE UNIV RES FND		3,910 *
COLUMBUS	OHIO	3,910
OHIO STATE UNIVERSITY THE		1,451 *
COLUMBUS	OHIO	1,451
OHIO WESLEYAN UNIVERSITY		41 *
DELAWARE	OHIO	41
OKLAHOMA MEDICAL RESEARCH FOUN		125 *
OKLAHOMA CITY	OKLAHOMA	125
OKLAHOMA STATE UNIV AP SC		2,677 *
EGLIN AIR FORC	FLORIDA	1,675
STILLWATER	OKLAHOMA	1,002
OLD DOMINION UNIVERSITY		80 *
NORFOLK	VIRGINIA	80
OLD DOMINN UNV RES FNDN		378 *
ARLINGTON	VIRGINIA	29
NORFOLK	VIRGINIA	349
OLYMPIA TYPEWRITERS		27 *
SACRAMENTO	CALIFORNIA	27
OREGON GRADUATE CNTR RESRCH		7,991 *
BEAVERTON	OREGON	7,991
OREGON HLTH SCNCS UNIV INC		356 *
PORTLAND	OREGON	356
OREGON STATE UNIVERSITY		6,283 *
CORVALLIS	OREGON	6,283
PACIFIC MEDICAL CENTER INC		100 *
SAN FRANCISCO	CALIFORNIA	100
PACIFIC NORTHWEST BELL		128 *
SEATTLE	WASHINGTON	128
PALISADES INSTT FOR RSRCH		123 *
NEW YORK	NEW YORK	123
PENNSYLVANIA HOSPITAL		180 *
PHILADELPHIA	PENN	180
PENNSYLVANIA STATE UNIVERSITY		18,913 *
WORCESTER	MASS	57
HERSHEY	PENN	244
STATE COLLEGE	PENN	18,612
PETER BENT BRIGHAM HOSP		36-*
BOSTON	MASS	36-
PIERCE J B FNDTN CT INC		177 *
HARTFORD	CONN	30
NEW HAVEN	CONN	147
POLYTECHNIC INSTITUTE OF NY		1,737 *
BROOKLYN	NEW YORK	500
FARMINGDALE	NEW YORK	131
NEW YORK	NEW YORK	1,106
PORTLAND STATE UNIVERSITY		132 *
PORTLAND	OREGON	132
PRINCETON UNIVERSITY		2,904 *
MONMOUTH JUNCT	NEW JERSEY	296
PRINCETON	NEW JERSEY	2,608
PURDUE UNIVERSITY		3,307 *
LAFAYETTE	INDIANA	548
WEST LAFAYETTE	INDIANA	2,759
QUEENS COLLEGE CUNY		120 *
NEW YORK	NEW YORK	120

- = MINUS AMOUNT (CANCELLATIONS EXCEED NEW AWARDS)

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
RAND CORPORATION THE		28,886 •
LOS ANGELES	CALIFORNIA	18,563
SANTA MONICA	CALIFORNIA	10,323
REESE MICHAEL HOSP & MED CTR		80 •
CHICAGO	ILLINOIS	80
REGIS COLLEGE		461 •
HANSCOM AIR FO	MASS	126
WELLESLEY	MASS	101
WESTON	MASS	234
RENSSELAER PLYTCHNC INS		3,101 •
TROY	NEW YORK	3,101
RESEARCH FNDTN CTY UNVRSTY		884 •
BROOKLYN	NEW YORK	125
NEW YORK	NEW YORK	759
RESEARCH FNDTN MENTAL HYGINE		263 •
ALBANY	NEW YORK	263
RESEARCH FNDTN/ST UNIV OF NY		1,860 •
ALBANY	NEW YORK	1,240
BUFFALO	NEW YORK	315
STONY BROOK	NEW YORK	305
RESEARCH INST/CO INC		376 •
FORT COLLINS	COLORADO	376
RESEARCH TRIANGLE INSTITUTE		2,402 •
RALEIGH	N CAROLINA	79
RESEARCH TRIAN	N CAROLINA	2,323
RETINA FOUNDATION		99 •
BOSTON	MASS	99
RICE WILLIAMS MARSH UNIV INC		418 •
HOUSTON	TEXAS	418
RIVERSIDE RESEARCH INSTITUTE		4,827 •
HUNTSVILLE	ALABAMA	288
BEDFORD	MASS	205
NEW YORK	NEW YORK	4,334
ROCHESTER INST TECH		475 •
WASHINGTON	DIST COL	60
ROCHESTER	NEW YORK	415
ROCKEFELLER UNIVERSITY INC		181 •
NEW YORK	NEW YORK	181
RUSH-PRESBYTRN ST LKS MED CTR		250 •
CHICAGO	ILLINOIS	250
RUTGERS THE STATE UNIVERSITY		5,653 •
NEW BRUNSWICK	NEW JERSEY	771
PISCATAWAY	NEW JERSEY	4,832
PISCATAWAYTOWN	NEW JERSEY	50
SALK INSTITUTE		2,580 •
SAN DIEGO	CALIFORNIA	105
SWIFTWATER	PENN	2,475
SAN DIEGO STATE UNIVERSITY		81 •
SAN DIEGO	CALIFORNIA	81
SAN JOSE STATE UNIVERSITY INC		246 •
SAN JOSE	CALIFORNIA	246
SAN JOSE STATE UNIV FOUND		283 •
SAN JOSE	CALIFORNIA	283
SCRIPPS CLINIC & RESRCH FNDTN		341 •
PLACENTIA	CALIFORNIA	100
SAN DIEGO	CALIFORNIA	241
SMITHSONIAN INSTITUTION		606 •
WASHINGTON	DIST COL	191
CAMBRIDGE	MASS	415
SOUTHEASTERN CT ELCT ENGNR ED		5,030 •
AURANTIA	FLORIDA	100
SAINT CLOUD	FLORIDA	4,788
BEDFORD	MASS	47
BUFFALO	NEW YORK	60
ROME	NEW YORK	35
SOUTHERN ILLINOIS UNIVERSITY		126 •
CARBONDALE	ILLINOIS	126
SOUTHERN METHODIST UNIV		486 •
DALLAS	TEXAS	486
SOUTHERN RESEARCH INSTITUTE		4,069 •
BIRMINGHAM	ALABAMA	4,024
WATERTOWN	MASS	45
SOUTHWEST FOUNDTN BMDCL RSRCH		257 •
SAN ANTONIO	TEXAS	257
SOUTHWEST RESEARCH INSTITUTE		9,679 •
DALLAS	TEXAS	48
SAN ANTONIO	TEXAS	9,631
SRI INTERNATIONAL		44,031 •
MENLO PARK	CALIFORNIA	44,031
ST JOSEPHS UNIVERSTITY		130 •
PHILADELPHIA	PENN	130
ST LOUIS UNIVERSITY		107 •
ST. LOUIS	MISSOURI	107
STANFORD LELAND JR UNIVERSITY		27,928 •
LOS ANGELES	CALIFORNIA	1,698
MENLO PARK	CALIFORNIA	888
PALO ALTO	CALIFORNIA	1,868
SANTA CLARA	CALIFORNIA	50
STANFORD	CALIFORNIA	23,004
STANFORD UNIVE	CALIFORNIA	420
STANFORD UNIVERSTIY		2,433 •
STANFORD	CALIFORNIA	2,433
STANLEY RESEARCH FOUNDATION		83 •
SALT LAKE CITY	UTAH	83
STATE UNIVERSITY OF NEW YORK		858 •
ALBANY	NEW YORK	368
BUFFALO	NEW YORK	152
STONY BROOK	NEW YORK	338

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
STEVENS INSTITUTE TECHNOLOGY		1,873 *
HOBOKEN	NEW JERSEY	1,873
SYRACUSE RESEARCH CORP		3,114 *
SYRACUSE	NEW YORK	3,114
SYRACUSE UNIVERSITY		405 *
SYRACUSE	NEW YORK	405
TEMPLE UNIV COMNLTH SYS HGHER		290 *
PHILADELPHIA	PENN	290
TENNESSEE STATE UNIVERSITY		44 *
NASHVILLE	TENNESSEE	44
TEXAS A & M RESEARCH FDN		2,147 *
COLLEGE STATIO	TEXAS	2,147
TEXAS A & M UNIV SYSTEM THE		572 *
BALTIMORE	MARYLAND	152
VICKSBURG	MISS	119
COLLEGE STATIO	TEXAS	301
TEXAS CHRISTIAN UNIVERSITY		209 *
COLLEGE STATIO	TEXAS	70
FORT WORTH	TEXAS	139
TEXAS STATE OF		43 *
HOUSTON	TEXAS	43
TEXAS TECH UNIVERSITY		626 *
LUBBOCK	TEXAS	626
TEXTILE RESRCH INST INC		112 *
PRINCETON	NEW JERSEY	112
TRUDEAU INSTITUTE INC		59 *
SARANAC LAKE	NEW YORK	59
TRUSTEES COLUMBIA UNVRSTY		1,681 *
NEW YORK	NEW YORK	1,681
TUFTS UNIVERSITY		234 *
MEDFORD	MASS	234
TULANE UNIVERSITY		38 *
NEW ORLEANS	LOUISIANA	38
TUSKEGEE INSTITUTE		53 *
TUSKEGEE	ALABAMA	53
UNDERSEA MEDICAL SOCITY INC		97 *
BETHESDA	MARYLAND	97
UNIV OF MED & DENTISTRY OF NJ		232 *
NEWARK	NEW JERSEY	232
UNIVERSITY IL MDCL GIFT SHOP		109 *
CHICAGO	ILLINOIS	109
UNIVERSITY NC AT WILMINGTON		99 *
WILMINGTON	N CAROLINA	99
UNIVERSITY OF AKRON THE		169 *
AKRON	OHIO	169
UNIVERSITY OF ALABAMA		1,859 *
BIRMINGHAM	ALABAMA	472
HUNTSVILLE	ALABAMA	702
TUSKEGEE	ALABAMA	685
UNIVERSITY OF ALASKA		826 *
FAIRBANKS	ALASKA	826
UNIVERSITY OF ARIZONA		2,767 *
TEMPE	ARIZONA	70
TUCSON	ARIZONA	2,697
UNIVERSITY OF CAL SYS WIDE ADM		44,631 *
BERKELEY	CALIFORNIA	10,636
DAVIS	CALIFORNIA	440
IRVINE	CALIFORNIA	1,944
ISLA VISTA	CALIFORNIA	96
LOS ALTOS	CALIFORNIA	116
LOS ANGELES	CALIFORNIA	8,724
PLACENTIA	CALIFORNIA	13,437
RIVERSIDE	CALIFORNIA	287
SAN DIEGO	CALIFORNIA	3,139
SAN FRANCISCO	CALIFORNIA	1,032
SANTA BARBARA	CALIFORNIA	2,336
SANTA CRUZ	CALIFORNIA	264
WRIGHT PATTERS	OHIO	4,029
UNIVERSITY OF CHICAGO THE		676 *
CHICAGO	ILLINOIS	676
UNIVERSITY OF CINCINNATI		960 *
CINCINNATI	OHIO	960
UNIVERSITY OF COLORADO		2,338 *
BOULDER	COLORADO	1,837
COLORADO SPRIN	COLORADO	275
DENVER	COLORADO	226
UNIVERSITY OF CONN FOUNDATION		862 *
STORRS	CONN	862
UNIVERSITY OF DAYTON		16,688 *
WILLIAMS AIR F	ARIZONA	3,186
EDWARDS AIR FC	CALIFORNIA	416
DAYTON	OHIO	10,107
WRIGHT PATTERS	OHIO	2,979
UNIVERSITY OF DELAWARE INC		608 *
NEWARK	DELAWARE	608
UNIVERSITY OF DENVER		271 *
DENVER	COLORADO	271
UNIVERSITY OF DETROIT INC		80 *
DETROIT	MICHIGAN	80
UNIVERSITY OF DISTRICT OF COLU		73 *
WASHINGTON	DIST COL	73
UNIVERSITY OF FLORIDA		4,936 *
GAINESVILLE	FLORIDA	4,936
UNIVERSITY OF GEORGIA		484 *
ATHENS	GEORGIA	484

Table 1. Educational and Other Nonprofit Institutions In the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Continued)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
UNIVERSITY OF HAWAII		2,016 *
HONOLULU	HAWAII	2,016
UNIVERSITY OF HOUSTON SYSTEM		749 *
HOUSTON	TEXAS	749
UNIVERSITY OF ILLINOIS		10,922 *
CHAMPAIGN	ILLINOIS	3,621
CHICAGO	ILLINOIS	1,766
URBANA	ILLINOIS	5,535
UNIVERSITY OF IOWA INC THE		2,028 *
IOWA CITY	IOWA	2,028
UNIVERSITY OF KANSAS		909 *
KANSAS CITY	KANSAS	296
LAWRENCE	KANSAS	260
LAWRENCE	KANSAS	353
UNIVERSITY OF KENTUCKY		423 *
LEXINGTON	KENTUCKY	423
UNIVERSITY OF LOUISVILLE		150 *
LOUISVILLE	KENTUCKY	150
UNIVERSITY OF LOWELL ASSOC INC		666 *
LOWELL	MASS	666
UNIVERSITY OF MARYLAND INC		7,016 *
BALTIMORE	MARYLAND	808
COLLEGE PARK	MARYLAND	6,208
UNIVERSITY OF MIAMI INC		3,591 *
CORAL GABLES	FLORIDA	2,356
MIAMI	FLORIDA	1,235
UNIVERSITY OF MICHIGAN		4,659 *
ANN ARBOR	MICHIGAN	4,659
UNIVERSITY OF MINNESOTA		2,214 *
MINNEAPOLIS	MINNESOTA	792
ST. PAUL	MINNESOTA	1,391
ST. PAUL	MISSOURI	31
UNIVERSITY OF MISSISSIPPI		469 *
JACKSON	MISS	200
OXFORD	MISS	230
UNIVERSITY OF	MISS	39
UNIVERSITY OF MISSOURI		1,269 *
COLUMBIA	MISSOURI	1,269
UNIVERSITY OF NEBRASKA THE		415 *
LINCOLN	NEBRASKA	366
OMAHA	NEBRASKA	49
UNIVERSITY OF NEVADA SYSTEM		269 *
RENO	NEVADA	269
UNIVERSITY OF NEW MEXICO THE		20,504 *
ALBUQUERQUE	NEW MEXICO	1,645
KIRTLAND AIR F	NEW MEXICO	18,859
UNIVERSITY OF NORTH CAROLINA		2,166 *
CHAPEL HILL	N CAROLINA	2,166
UNIVERSITY OF NOTRE DAME		383 *
NOTRE DAME	INDIANA	383
UNIVERSITY OF OKLAHOMA		598 *
NORMAN	OKLAHOMA	283
OKLAHOMA CITY	OKLAHOMA	315
UNIVERSITY OF OREGON		731 *
ESTACADA	OREGON	32
EUGENE	OREGON	699
UNIVERSITY OF PACIFIC INC		96 *
SAN FRANCISCO	CALIFORNIA	96
UNIVERSITY OF PENNSYLVANIA		6,163 *
PHILADELPHIA	PENN	6,121
STATE COLLEGE	PENN	42
UNIVERSITY OF PGH COMMON		1,914 *
PITTSBURGH	PENN	1,914
UNIVERSITY OF PUERTO RICO		311 *
SAN JUAN	PUERTO RCO	147
NORFOLK	VIRGINIA	164
UNIVERSITY OF RHODE ISLAND		2,647 *
KINGSTON	RHODE ISL	2,647
UNIVERSITY OF RICHMOND		43 *
RICHMOND	VIRGINIA	43
UNIVERSITY OF ROCHESTER		2,036 *
ROCHESTER	NEW YORK	2,036
UNIVERSITY OF SOUTH CAROLINA		91 *
COLUMBIA	S CAROLINA	91
UNIVERSITY OF SOUTH FLORIDA		490 *
TAMPA	FLORIDA	490
UNIVERSITY OF SOUTHERN CAL		26,140 *
MARBLE FALLS	ARKANSAS	300
LOS ALTOS	CALIFORNIA	148
LOS ANGELES	CALIFORNIA	25,692
UNIVERSITY OF TENNESSEE		809 *
KNOXVILLE	TENNESSEE	413
MEMPHIS	TENNESSEE	135
TULLAHOMA	TENNESSEE	261
UNIVERSITY OF TEXAS SYSTEM		36,263 *
ARLINGTON	TEXAS	298
AUSTIN	TEXAS	34,068
EL PASO	TEXAS	93
GALVESTON	TEXAS	295
HOUSTON	TEXAS	282
RICHARDSON	TEXAS	743
SAN ANTONIO	TEXAS	484
UNIVERSITY OF TULSA THE		126 *
TULSA	OKLAHOMA	126
UNIVERSITY OF UTAH		9,729 *
SALT LAKE CITY	UTAH	9,729

Table 1. Educational and Other Nonprofit Institutions in the United States Receiving DOD Prime Contracts Over $25,000 for RDT&E Work: FY 1984 (Concluded)

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
UNIVERSITY OF VIRGINIA		844 *
CHARLOTTESVILL	VIRGINIA	844
UNIVERSITY OF WASHINGTON		18,114 *
SEATTLE	WASHINGTON	18,114
UNIVERSITY OF WISCONSIN SYSTEM		5,594 *
MADISON	WISCONSIN	5,471
MILWAUKEE	WISCONSIN	123
UNIVERSITY OF WYOMING		438 *
LARAMIE	WYOMING	438
UTAH STATE UNIVERSITY		5,548 *
LOGAN	UTAH	5,266
SALT LAKE CITY	UTAH	282
VANDERBILT UNIVERSITY THE		753 *
MOUNT VERNON	PENN	75
NASHVILLE	TENNESSEE	678
VERMONT UNIV OF		158 *
BURLINGTON	VERMONT	158
VIRGINIA COMMONWEALTH UNIV		578 *
RICHMOND	VIRGINIA	578
VIRGINIA MASON RESEARCH CTR		81 *
SEATTLE	WASHINGTON	81
VIRGINIA PLYTCHNC INST/ST UNIV		3,411 *
BLACKSBURG	VIRGINIA	3,411
VIRGINIA TECH FNDTN INC		70 *
BLACKSBURG	VIRGINIA	70
WASHINGTON BOOKER T FOUNDATIN		3,968 *
WASHINGTON	DIST COL	3,968
WASHINGTON SCHOOL PSYCHIATRY		52 *
WASHINGTON	DIST COL	52
WASHINGTON STATE [illegible]		1,320 *
BETHESDA	MARYLAND	62
PULLMAN	WASHINGTON	797
SEATTLE	WASHINGTON	461
WASHINGTON UNIVERSITY		2,505 *
ST. LOUIS	MISSOURI	2,505
WAYNE STATE UNIVERSITY		737 *
DETROIT	MICHIGAN	737
WENTWORTH INST TECHNOLOGY		1,371 *
BOSTON	MASS	1,371
WESTERN KENTUCKY UNIVERSITY		66 *
BOWLING GREEN	KENTUCKY	66
WILLIAMS COLLEGE		55 *
WILLIAMSTOWN	MASS	55
WOODS HOLE OCEANOGRAPHIC INSTN		16,013 *
WOODS HOLE	MASS	16,013
WORCESTER PLYTCHNC INST		89 *
WORCESTER	MASS	89
WRIGHT STATE UNIVERSITY		756 *
DAYTON	OHIO	386
WRIGHT PATTERS	OHIO	502
YALE UNIVERSITY		4,990 *
NEW HAVEN	CONN	4,990
YESHIVA UNIVERSITY		67 *
NEW YORK	NEW YORK	67
		2,117,086

Table 2. U.S. Government Agencies Receiving DOD Prime Contract Awards Over $25,000 for RDT&E Work: FY 1984

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS	NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
ARGONNE NATIONAL LAB		149 *		
ARGONNE	ILLINOIS	148		
LAWRENC LVRMR LBRTY BERKLY ASS		506 *		
BERKELEY	CALIFORNIA	37		
LIVERMORE	CALIFORNIA	200		
OAKLAND	CALIFORNIA	269		
NATIONAL AERONAUTIC ADSM USA		14,400 *		
WASHINGTON	DIST COL	14,400		
NATIONAL SCIENCE FOUNDATION		969 *		
WASHINGTON	DIST COL	969		
SMALL BUSINESS ADMINISTRATION		298 *		
WASHINGTON	DIST COL	298		
U S DEPARTMENT OF COMMERCE		2,336 *		
BOULDER	COLORADO	836		
WASHINGTON	DIST COL	1,294		
GAITHERSBURG	MARYLAND	100		
ROCKVILLE	MARYLAND	50		
SEATTLE	WASHINGTON	56		
U S NATL AERO SPACE ADM		250 *		
PASADENA	CALIFORNIA	175		
WASHINGTON	DIST COL	35		
GREENBELT	MARYLAND	40		
UNITED STATES DEPT ENERGY		1,398 *		
OAKLAND	CALIFORNIA	381		
IDAHO FALLS	IDAHO	66		
ARGONNE	ILLINOIS	80		
ALBUQUERQUE	NEW MEXICO	380		
LOS ALAMOS	NEW MEXICO	100		
OAK RIDGE	TENNESSEE	396		
US PATENT & TRADEMARK		270 *		
WASHINGTON	DIST COL	270		
		20,549		

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $25,000 for RDT&E Work: FY 1984

NAME OF CONTRACTOR AND LOCATION		THOUSANDS OF DOLLARS
ABTEILUNG FUR D'GITALE		35 *
	AUSTRIA	35
ARISTOTELIAN UNIVERSITY		26 *
	GREECE	26
AVON INDUSTRIAL POLYMERS (BRAD		350 *
	UN KINGDOM	350
BEN-GURION UNIVERSITY OF THE N		69 *
	ISRAEL	69
BRUNEL UNIVERSITY		162 *
	UN KINGDOM	162
BUNDESAMT FUER WEHRTECHNIK		50 *
	GERMANY W	50
CANADIAN COMMERCIAL CORPORATN		20,608 *
	CANADA	20,608
CATHOLIC UNIVERSITY OF LEUVE		32 *
	BELGIUM	32
CERAMIC & SILICATE INST		35 *
	ISRAEL	35
CMC ELECTRONICS INC		191 *
	CANADA	191
CONCORDIA UNIVERSITY		164 *
	CANADA	164
CONTROL DATA CANADA LIMITED		72 *
	CANADA	72
CORK GEOTECHNICS LTD		29 *
	IRELAND	29
DALHOUSIE UNIVERSITY		102 *
	CANADA	102
ERA TECHNOLOGICAL LTD		43 *
	UN KINGDOM	43
ERNST MACHINSTITUT		25 *
	GERMANY W	25
F GAN		30 *
	GERMANY W	30
HEBREW UNIV OF JERUSALEM		70 *
	ICELAND	28
	ISRAEL	42
HECKLER & KOCH INC		662 *
CHANTILLY	VIRGINIA	662
HELLY-HANSEN A/S		33 *
	NORWAY	33
HUNTINGDON RESEARCH CENTER		123 *
	UN KINGDOM	123
IMPERIAL COLLEGE OF SCIENCE		191 *
	UN KINGDOM	191
INGENIEURBURO DEISENROTH		350 *
	GERMANY W	350
INSTITUTE OF MEDICAL RESEARCH		79 *
	GUINEA	79
IRVIN INDUSTRIES CANADA LTD		28 *
	CANADA	28
ISRAEL AIRCRAFT INDUSTRIES LTD		285 *
	ISRAEL	285
ISRAEL INSTITUTE FOR BIO RE		71 *
	ISRAEL	71
ISRAEL MILITARY INDUSTRIES		1,000 *
	ISRAEL	1,000
KINGSTON POLYTECHNIC		27 *
	UN KINGDOM	27
LABORATOIRE DE PHYSICS		26 *
	FRANCE	26
LONDON SCHOOL OF HYGIENE		65 *
	UN KINGDOM	65
LUCAS C W LTD		98 *
	CANADA	98
MARCONI AVIONICS LTD		665 *
EDWARDS AIR FO	CALIFORNIA	83-
	UN KINGDOM	748
MC GILL UNIVERSITY		67 *
	CANADA	67
N V SLAGTERIGERIGN NORVEST		27 *
	NETHERLAND	27
NATIONAL BACTERIOLOGICAL		49 *
	SWEDEN	49
NEGRETTI & ZAMBRA LTD		68 *
	UN KINGDOM	68
NETHERLANDS CENTRAL ORGAN		64 *
	NETHERLAND	64
NIMPIEZA GENERAL SA		89 *
	PANAMA	89
NMI LTD		26 *
	UN KINGDOM	26
NORSAR		780 *
	NORWAY	780
OPEN UNIVERSITY		46 *
	UN KINGDOM	46
OPTIK & INFO		47 *
	GERMANY W	47
OXFORD ANALYTICA INC		188 *
	UN KINGDOM	188

- = MINUS AMOUNT (CANCELLATIONS EXCEED NEW AWARDS)

Table 3. Foreign Institutions and Government Agencies Receiving DOD Prime Contract Awards Over $25,000 for RDT&E Work: FY 1984 (Concluded)

NAME OF CONTRACTOR AND LOCATION	THOUSANDS OF DOLLARS
OXFORD APPLIED RESEARCH UK KINGDOM	38 * 38
PEARSON T B & SONS LTD UK KINGDOM	164 * 164
PORTSMOUTH POLYTECHNIC UK KINGDOM	47 * 47
ROYAL NORWEGIAN NAVY MATERIAL NORWAY	174 * 174
SOCIETY ANONY MEDETELECO FRANCE	69 * 69
SPECTRONIX ISRAEL	42 * 42
TADIRAN LTD ISRAEL	150 * 150
TECHNION RESEARCH & DEVELOPMEN ISRAEL	119 * 119
TECHNOLOGY FOR SOCIETY NETHERLAND	77 * 77
TEL AVIV UNIVERSITY ISRAEL	101 * 101
THE WEIZMAN INST OF SCIENCE ICELAND	36 * 36
THORN EMI TECHNOLOGY INC UK KINGDOM	47 * 47
TWETESCHNIK HERBER DR MED GERMANY W	28 * 28
UNITED KINGDOM MINISTRY DEFE UK KINGDOM	162 * 162
UNIV OF TORONTO CANADA	198 * 198
UNIVERSITA DI MODENA ITALY	29 * 29
UNIVERSITAT HANNOVER GERMANY W	38 * 38
UNIVERSITY COLLEGE OF GALWAY IRELAND	31 * 31
UNIVERSITY COLLEGE OF NORTH WA UK KINGDOM	36 * 36
UNIVERSITY OF ALBERTA CANADA	26 * 26
UNIVERSITY OF BRISTOL SENATE H UK KINGDOM	38 * 38
UNIVERSITY OF CAMBRIDGE UK KINGDOM	33 * 33
UNIVERSITY OF LIVERPOOL UK KINGDOM	27 * 27
UNIVERSITY OF LONDON UK KINGDOM	88 * 88
UNIVERSITY OF OXFORD UK KINGDOM	81 * 81
UNIVERSITY OF ST ANDREWS UK KINGDOM	58 * 58
UNIVERSITY OF SURREY UK KINGDOM	34 * 34
UNIVERSITY OF TECHNOLOGY UK KINGDOM	37 * 37
UNIVERSITY OF VIENNA AUSTRIA	90 * 90
UNIVERSITY OF WESTERN ONTARIO CANADA	148 * 148
VAISALA INC WOBURN MASS	78 * 78
YORK UNIVERSITY CANADA	81 * 81
	29,747

SUBCOMMITTEE RECESS

Senator RUDMAN. We are recessed until Wednesday, March 5, tomorrow, when we will hear from SDI.

[Whereupon, at 11:45 a.m., Tuesday, March 4, the subcommittee was recessed to reconvene at 10 a.m., Wednesday, March 5, 1986.]

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